September 30, 1935

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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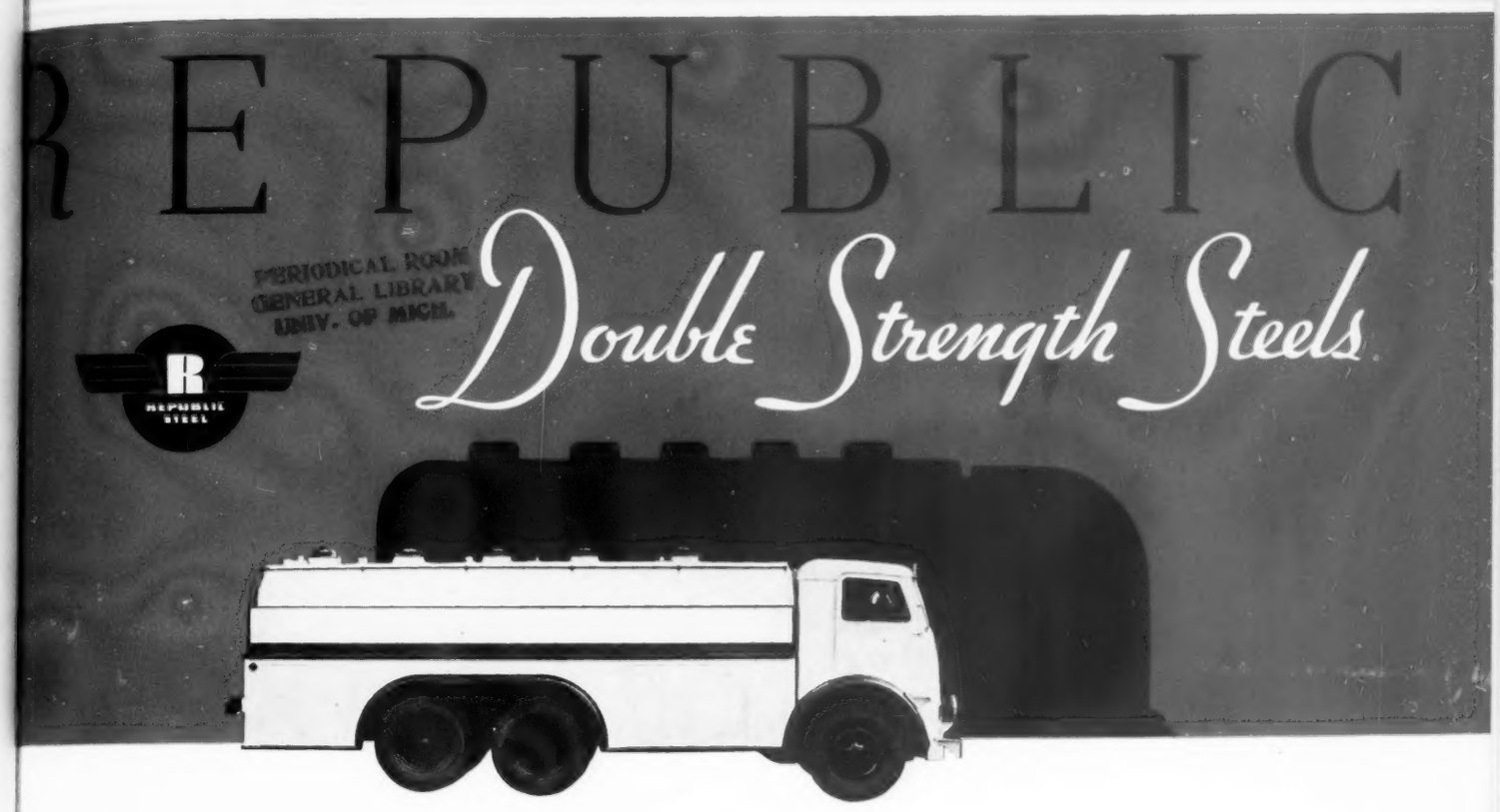

LIGHTEN AUTOMOTIVE LOADS

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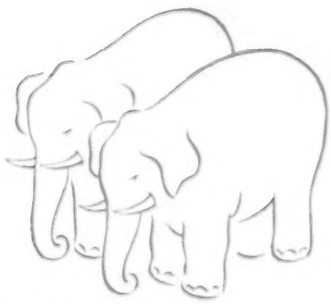

REDUCE *the* WEIGHT . . .
MAINTAIN *the* STRENGTH

Republic Steel

CORPORATION

GENERAL OFFICES · · · YOUNGSTOWN, OHIO
CENTRAL ALLOY DIVISION · · MASSILLON, OHIO

TAKE ONE POUND OF STEEL DO THE WORK OF TWO

No. 49 Bore-Matic . . . UNIVERSALLY ARRANGED

FOR SMALL LOT PRODUCTION OF A VARIETY OF PARTS

HERE is a precision boring machine that is exceptionally universal in its operation. It is easy and convenient to set up and will bore, turn or face either straight or angular work. It is ideal for small lot production of a variety of parts such as might be found in a machine tool shop.

This machine is of sturdy, rugged construction with a single bridge having a swivel plate upon which is mounted a single boring head or workhead. Where a workhead is used on the bridge, it can be equipped with a draw bar operating unit for chucks or collets.

A manually operated cross slide is mounted on the table for either work fixtures or tool holders. With this arrangement work will be held in a rotating chuck or a stationary fixture on the table and likewise the cutting tool may be either the rotating or stationary type as occasion requires.

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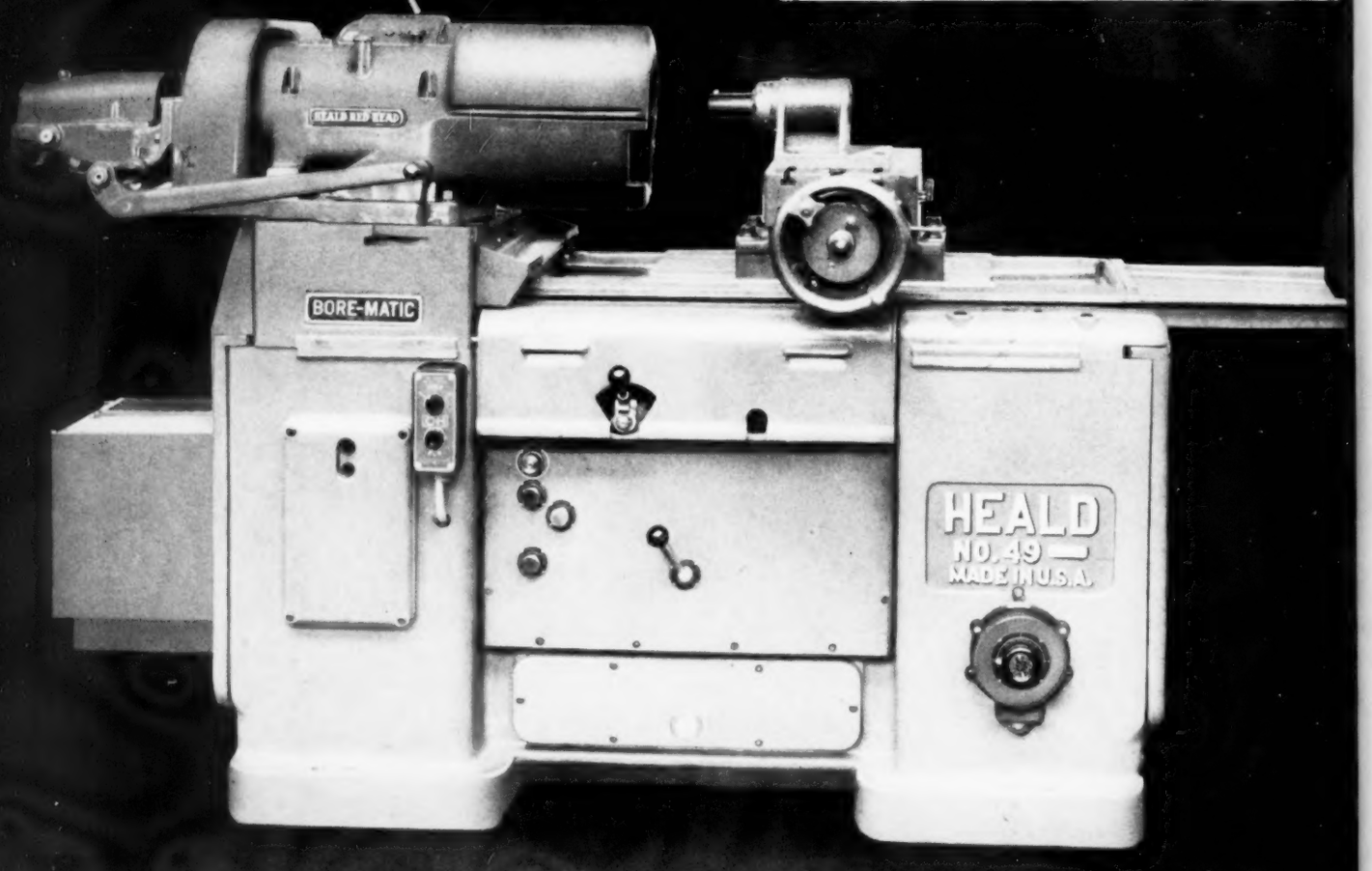
THE HEALD MACHINE COMPANY
Worcester, Massachusetts, U. S. A.



STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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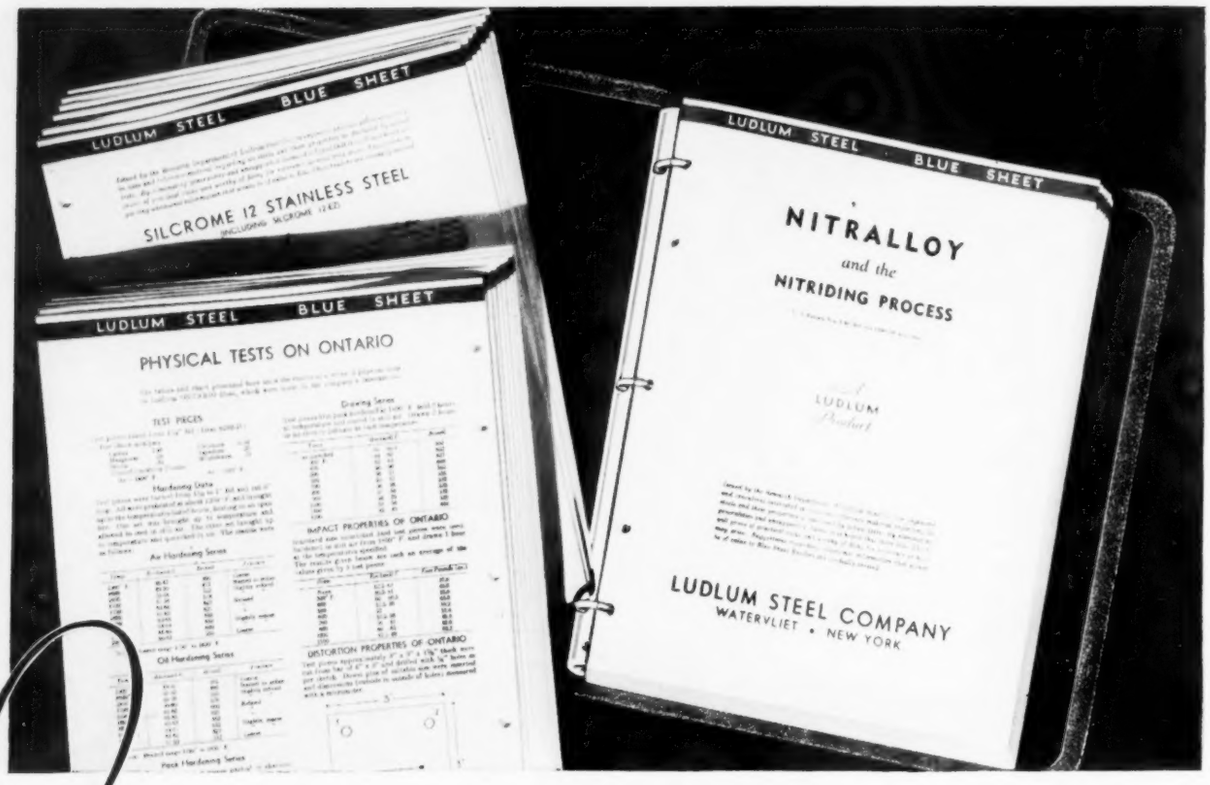
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In January of 1932 Ludlum inaugurated through its Research Department a new service for engineers and executives interested in data and reference material regarding its steels and their properties as disclosed by actual tests—the Ludlum Blue Sheets.

Month by month the work of testing, compiling data and publishing new Blue Sheets has progressed without interruption until today the service covers 19 important grades of High Speed, Alloy Die, Hot Work, Alloy Shock Resisting, Carbon Tool and Silcrome Stainless steels.

If your responsibility includes purchase or use of Tool Steel, Nitralloy or Stainless Steel, you will doubtless be interested in the Blue Sheet data. In order that you may check Blue Sheets you are lacking, or that would interest you at the present time, we indicate in the coupon at right the Blue Sheets now available. There is no cost or obligation. Just check the sheets desired.

Research Department, Ludlum Steel Company
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NITRALLOY
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- ☐ Seminole Shock Resisting Tool Steel

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STEEL
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As the Editor Views the News

NEWS of the week is heavily freighted with announcements of new mergers and of approval or consummation of previously reported merger plans. The changes in Carnegie-Illinois, Republic-Corrigan, McKinney-Truscon-Newton, etc., Inland-Ryerson, and in the lesser combinations will have far-reaching effects, some of them difficult to predict in advance. One immediate result is an extensive reshuffling of personnel (p. 9), in which many younger executives are being elevated to positions of commanding authority. The injection of new blood into management, combined with the advantages of unification, probably will make for more aggressive leadership and certainly will intensify competition.

• • •

Steel, Wheat and Neutrality

What to do in case of war abroad is occupying the attention of Washington. Machinery for registering manufacturers and licensing exports in the interest of neutrality is being perfected. Six classifications of munitions designated by President Roosevelt for federal supervision (p. 8) include weapons of actual use in armed conflict but not steel or other materials. Should hostilities break out, it will be interesting to see how steel is regarded in comparison with wheat and cotton. Steelmakers usually are damned publicly for unholy traffic with Mars. Wheat and cotton farmers seldom are thus maligned, yet their contributions to war are no less important.

• • •

Workingmen Will Decide

The broad problem of industrial relations is becoming an important topic of discussion. New dealers, through the Wagner act, social "security" legislation and other similar plans, seem determined to foist upon the "forgotten man" social machinery of their own choosing. Therefore it is refreshing to note the opinion of Arthur H. Young, vice president of U. S. Steel (p. 46), to the effect that the answer to "what constitutes proper industrial relations machinery can be and will be given only by Mr. American Workman himself." This view is all the more significant when it is realized that new dealers themselves, in the past few weeks, have shown unmistakable signs of disgust with certain phases of the administration's relief activity. Much of its futile and expensive program aggravates (p. 19) rather than helps the problem of providing that elusive "more abundant life."

• • •

Sheets, Strip in Limelight

No one could have attended the convention of the Association of Iron and Steel Electrical Engineers last week without noticing the dominant position in the minds of steel mill engineers of equipment for rolling flat rolled steel. Problems relating to sheets and strip easily held the center of the stage. This is not surprising in view of the fact that 85 per cent of the horsepower installed for mill drives last year (p. 45) went for sheet and strip mills. Nineteen continuous wide strip mills have been built or authorized and four more are under consideration. Think what the 9,000,000 tons of annual capacity represented by these units means in terms of competition, of obsolescence, and of forced adjustments throughout industry!

• • •

More for Your Power Dollar

"Power Drives" is the title of a new department which makes its bow this week (p. 25) to readers of STEEL. Its purpose is to help executives in the metalworking industries to obtain greater efficiency, economy and satisfaction in their use of power. Discussion in this department, which will appear every week, will range from the comparatively simple problems, as for instance that of applying the proper drive to a common hacksaw machine (p. 25), to the most intricate problems of transmission equipment and methods. In brief, STEEL will try to make your power dollar go further and work harder. . . . Do you know that returns of 50 to 100 per cent annually (p. 28) can be realized on investments in modern machinery? They are not unusual today.

E. L. Shaner

Steel and Scrap Not Yet War Contraband, but Under Study

WAR talk in Europe, arising from the Italian-Ethiopian situation and its complications, cast a shadow over the iron and steel industry last week.

It was only a shadow because neither steel nor scrap was referred to in connection with the first proclamation issued by President Roosevelt in connection with contraband war supplies as set forth in the neutrality resolution passed by congress just prior to adjournment.

However, this proclamation deals only with the present situation. In event of war, the President is permitted to revise it.

Also, Secretary of Commerce Roper, who is a member of the new national munitions control board, stated definitely last week that a survey is to be made at once by that board of various industries such as steel, copper, cotton, etc., whose products might possibly later be declared contraband.

Six on Black List

Six categories of "arms, ammunitions and implements of war," all utilizing iron and steel, were declared contraband by the President. These are: 1—Rifles, machine guns, guns, ammunitions, grenades and bombs, tanks and armored vehicles; 2—warships of all kinds; 3—aircraft equipped for combat; 4—revolvers and automatic pistols; 5—aircraft and equipment other than in category 3; 6—chemical and flame throwers and gases.

Secretary of State Hull, who is chairman of the new munitions control board, has announced that all manufacturers, exporters and importers of arms, munitions and implements of war must register by Nov. 29, and that products falling within the six categories may not be exported or imported without a license for each shipment.

Within the iron and steel industry a wide difference of opinion concerning scrap and its implications for war exists.

It is reported in Washington that steel producers, viewing somewhat apprehensively large exports of scrap—one of their principal raw materials—over the past few years, would have been pleased had scrap been declared contraband. Generally, it is felt, such action would have tended to conserve scrap and hold down the price.

On the other hand, the scrap industry views it product as a legitimate item of foreign trade. Speaking before the American scrap exporters conference in New York recently, Benjamin Schwartz, director-general of the Institute of Scrap Iron and Steel Inc., maintained that scrap "has been a part of our foreign trade in iron and steel for at least 20 years, though public notice of that fact seems to have only been taken during the last two years."

In the first half of 1935 exports of scrap to Italy totaled 146,000 gross tons, 55 per cent higher than in the first half of 1934. From 1925 through 1932 Italy bought on an average 35,000 tons of scrap annually from the United States, but since 1933 the average has been 194,000 tons annually, an increase of over 450 per cent.

From 1925 through 1932 Japan bought an average of 106,000 tons of scrap per year from this country, but since then Japan has taken an average of 976,000 tons annually, an increase of 800 per cent. The first half of this year Japan's purchases here totaled 725,000 tons.

Expressing the sentiment in the minds of most steelmakers, who are consumers of scrap, the American Iron and Steel institute points out that the average price of heavy steel scrap has increased 69 per cent since 1932, while basic iron has advanced less than 29 per cent and the composite price of major finished steel products 8½ per cent.

August exports of scrap from the United States totaled 156,685 tons, or 49,094 tons less than in July.

Who Comprises Munitions Board

The munitions board consists of the secretary of state, chairman; and secretaries of the treasury, war, navy and commerce.

The purpose of the board is: (1) register before Nov. 30 all manufacturers of arms, munitions, and implements of war in this country, with their firm names, place of business and products; (2) require licenses before any consignment of munitions can be shipped to foreign nations in peacetime in the future; (3) define what products should be placed in the category of "arms, munitions and implements of war"; (4) make available to the President all arms data which may be of use to him in proclaiming an embargo on munitions shipments in the event of hostilities;

As Steel and Oil Men Meet

W. L. Mellon (left), chairman of the board of the Gulf Oil Corp. of Pennsylvania, and Irvin F. Lehman, first vice president of the Blaw-Knox Co., both of Pittsburgh, at an informal conference at the recent luncheon of the United States Steel Corp. in Pittsburgh. Wide World photo

and (5) provide congress with an annual report on munitions manufacture and export which may be of benefit to the nation's lawmakers in formulating other arms control measures.

Secretary Hull has established the "office of arms and munitions control" in his department to co-ordinate all federal activities for supervision of the arms traffic and Joseph C. Green, has been made chief of the new division and also secretary of the munitions control board. This new office is uder the direct jurisdiction of Assistant Secretary of State R. Walton Moore.

Graphite Price Is Threatened

Buyers of graphite crucibles are watching the Italian-Ethiopian dispute carefully because of the critical situation which will arise should the Suez canal be closed.

Practically the only source of graphite supply is Ceylon and Madagascar, all shipments being made to this country by way of the Suez canal. Should this become a war zone thus diverting shipments around the southern coast of Africa, the freight rate on graphite will increase immediately and be reflected in higher costs of crucible.

In fact, there is some talk in trade circles that the price of graphite will be advanced in the near future in anticipation of higher freight rates on the raw material.

Interest in Personnel High As Mergers Are Completed

MERGER developments last week touched the entire range of steel making and consuming industries. Republic Steel Corp. formally took over the Corrigan, McKinney Steel Co. and its affiliates, making a number of important changes in personnel. Inland Steel Co. stockholders placed a benediction on acquisition of the leading warehouse interest of Joseph T. Ryerson & Son Inc. The new Carnegie-Illinois Steel Corp. holds its first corporate meeting. Continental Can Co. announced its purchase of control of the Whittall Can Co. Ltd., while the Torrington Co. and Bantam Ball Bearing Co. united.

New Managers Named for Republic-Corrigan-Newton

PERSONNEL changes quickly followed formal passing of control of the Corrigan, McKinney Steel Co., Cleveland, to the Republic Steel Corp., Youngstown, O., last Wednesday morning.

H. B. Carpenter, manager of the Youngstown district of Republic, was appointed manager of the Corrigan-McKinney properties, including the Newton Steel Co., Monroe, Mich., and Newton Falls, O., and the N. & G. Taylor Co., Cumberland, Md.

Charles H. Elliott, manager of the Warren, O., district of Republic, was given the managership of the combined Youngstown and Warren district.

F. E. Flynn, assistant manager at Warren, was named general superintendent of that district, and R. L. Leventry, assistant manager of the Youngstown district, was promoted to general superintendent there.

Donald B. Gillies, who has been president of Corrigan-McKinney, was announced as a vice president of Republic.

The new Republic personnel thus is: Chairman and president, T. M. Girdler; executive vice president and general manager, R. J. Wysor; vice president, Myron A. Wick; vice president in charge of sales, N. J. Clarke; vice president in charge of operations, C. M. White; vice president, Donald B. Gillies; secretary and treasurer, Wayne Hancock; controller, P. F. Boyer.

Come Up Through Ranks

Mr. Carpenter, a graduate of the University of Michigan, became first helper in the chemical laboratories of the Cambria Steel Co., later superintendent of the coke plant, then assistant to the vice president of the Colorado Fuel & Iron Co., subsequently manager of its steelworks at Pueblo, Colo., and when Republic took over Trumbull Steel Co. in 1928 was made manager of the Youngstown district.

Mr. Elliott, after graduating from Purdue university, was a chemist with the Otis Steel Co., Cleveland. He, too, was with Colorado for a period, as open-hearth superintendent, from 1911 to 1919 was assistant superintendent of blast furnaces and steel plant for the Youngstown Sheet & Tube Co., going with the Weirton Steel Co. and Jones & Laughlin Steel Corp. before joining Trumbull in 1926. On its merger with Republic, he was appointed manager of the Warren district.

These changes became effective immediately following the action of interested stockholders in approving the acquisition of the assets of Corrigan-McKinney by Republic and

Stainless Steel Took This Photograph

When the American Rolling Mill Co., Middletown, O., made what is believed to be the largest stainless steel sheet ever manufactured, this is what the photographer found when he developed his negative. The mirror-like surface had picked up the images of the workmen who made it, and reflected them back into the camera's lens. The camera man was given preferred attention and even the windows and roof of the building appear in the reflected photo. The sheet is 84 by 90 inches, a giant us stainless steel sheets go. It is of No. 12 gage, and carries a No. 7 polish. The sheet is on display at the National Metal Congress in Chicago, Sept. 30 to Oct. 4

control of the Truscon Steel Co., Youngstown.

Changes in Republic's capitalization also were approved, including creation of a new class of prior preference stock, increase of the authorized amount of common stock, provisions for exchange of the present preferred for the new prior preference and the sale of $24,000,000 of convertible general mortgage bonds.

In payment for the plants and properties, business and good will of Corrigan-McKinney, Republic is assuming all of the former's liabilities and delivering $15,361,000 20-year purchase money Republic bonds, 27,929 shares of new prior preference Republic stock, and 698,223 shares of Republic common stock.

To Truscon stockholders, Republic offers, subject to consummation of acquisition of Corrigan-McKinney, one-half share of prior preference stock and two shares of common stock of Republic for each share of Truscon preferred; and four-tenths of a share of Republic common for each share of Truscon common.

Materially Strengthens Position

The merger, while not altering Republic's status as the third largest steel company, will substantially strengthen its standing in this respect. The pro forma consolidated balance sheet of the company, giving effect to the plan as of June 30, 1935, contained in the prospectus issued in connection with the new Republic securities (assuming that all present Republic preferred stock and Truscon stock are exchanged in accordance with the plan) indicates total assets of Republic, after completion of the plan, of $301,432,465, with total current assets of $69,013,324 as compared to total current liabilities of $10,460,371.

Republic's plants in Cleveland, Youngstown, Canton, Massillon, and Warren, O., provide outlets for the surplus pig iron and semifinished steel produced by Corrigan-McKinney at Cleveland. Republic and its subsidiaries will have water frontage plants and docks at Cleveland, Buffalo, Chicago and Monroe, Mich.

The Newton Steel Co., a subsidiary of Corrigan-McKinney, strengthens Republic's competitive position in the automobile sheet market. Truscon, a distributor of fabricated steel products, assures broad marketing outlets for Republic and Corrigan-McKinney.

GOES INTO AIR-CONDITIONING

Waukesha Motor Co., Waukesha, Wis., maker of industrial gasoline and oil engines, including diesels, has announced plans for large-scale production of air-conditioning units for railroad coaches, homes, stores, hotels, and apartments.

H. B. Carpenter

Hold First Meeting of Carnegie-Illinois Monday

LAST week's developments in reorganization of the United States Steel Corp, touched off by unification of the Carnegie Steel Co. and Illinois Steel Co. as the Carnegie-Illinois Steel Corp., were:

Benjamin F. Fairless, president of Carnegie-Illinois, moved into the offices of I. Lamont Hughes, Carnegie president, in the Carnegie building, Pittsburgh, Mr. Hughes going to another suite on the eleventh floor.

From an authoritative source it was learned that headquarters of the combined American Sheet & Tin Plate Co. and American Steel & Wire Co. are also expected to be in Pittsburgh. Sheet & Tin Plate already is there, but President Blackmer of Steel & Wire is in Cleveland.

Announcements of merging of Corporation sales forces in leading cities, similar to that in Detroit as detailed in STEEL last week, p. 24, are expected shortly.

First corporate meeting of Carnegie-Illinois was called for Sept. 30 in Pittsburgh.

On Sept. 26, the agreement forming the organization which will become the Carnegie-Illinois Steel Corp. was filed. Officers who were named in the original filing were: Benjamin F. Fairless, president, J. W. Hamilton, secretary, H. E. Jeffries, treasurer, and William Donald, auditor. Previously, Mr. Hamilton was secretary of Carnegie, Mr. Jeffries was treasurer, and Mr. Donald was auditor. No announcement has as yet been made on vice presidents or other officers.

At the same time, the agreement also named directors of Carnegie-Illinois as follows: W. A. Irvin, Benjamin F. Fairless, I. Lamont Hughes, G. Cook Kimball, L. H. Burnett, William Donald, McGilvray Shiras, W. I. Howland Jr., Carroll Burton, E. R. Stettinius Jr., H. L. Austin, C. V. McKaig, Robert Gregg, and R. H. Watson.

CONTINENTAL NOW CONTROLS WHITTALL CAN CO. LTD.

Continental Can Co. Inc., New York, has purchased a majority interest in the common stock of the Whittall Can Co. Ltd., Montreal, Que., at $8.50 per share, which is also offered to remaining holders of Whittall common.

Whittall is one of the leading can manufacturers of Canada. Newly-elected officers of Whittall were officially announced; C. C. Conway, chairman of the board (also chairman of Continental); O. C. Huffman, president (also president of Continental); W. W. Tomkins, executive vice president (Continental); D. S. Whittall, vice president in charge of manufacture, and D. H. Macfarlane secretary and treasurer.

In addition, the following were elected to the board; J. F. Hartlieb, vice president, Continental; Robert Barlow, managing director, Metal Box Co. Ltd. of London; J. A. Mann, K. C.; F. A. Whittall, in charge of sales; and Col. E. Gerald Hanson.

THREE RYERSON MEN GO ON BOARD OF INLAND

Upon formal approval by stockholders of the Inland Steel Co. Chicago, last week, the acquisition of Joseph T. Ryerson & Son Inc., Chicago, a leading warehouse interest, was consummated. For Ryerson, Inland paid 240,000 shares of common. Edward L. Ryerson Jr., now president and a director; Joseph T. Ryerson, a former president and also now a director; and Everett D. Graff, first vice president and director, all of Ryerson, have been made directors of Inland.

TORRINGTON CO. ACQUIRES BANTAM BALL BEARING

Bantam Ball Bearing Co., South Bend, Ind., and the Torrington Co., Torrington, Conn., have arranged for an exchange of stock. The Torrington Co. will maintain its newly-acquired plant at South Bend with no changes in personnel at this time, and with K. L. Hermann, general manager of the Bantam company, continuing in that capacity.

The Torrington Co. was founded in 1866 and operates plants in Torrington, Conn.; Orange and Westfield, Mass.; Upper Bedford, Quebec; Coventry, England, and Aachen, Germany. The Bantam company manufactures ball and roller bearings of all types and sizes up to 60-inch diameters.

Industrial Advertisers See Revival in Capital Goods; Davison New President

R. DAVISON, advertising manager of the New Jersey Zinc Co., New York, president-elect of the National Industrial Advertisers' association, at the closing session of the organization at the William Penn hotel, Sept. 20, declared the meeting unmistakably pointed to the reviving prosperity of the capital goods industry. The convention was the largest and most successful in N.I.A.A. history.

"This 13th annual meeting of the N. I. A. A. by the size and representative character of its attendance, by the number, diversity and scope of the exhibits, by the range of subjects treated, and by the general interest shown, has achieved an outstanding record in the history of this organization," said Mr. Davison.

"All this symbolizes something more than a highly successful convention and the continued progress of our craftsmanship as industrial advertising managers. It marks significantly the reawakening of new faith and planning for the future by the capital goods industry, which by common knowledge now is the main factor lacking for the restoration of our national prosperity.

"The capital goods industry as never before needs the impulse of vitalized and forceful promotion to quickly and effectively market its innumerable new and improved products if it is to play its accustomed part in our national economy.

"As advertising managers serving industry broadly, let us be faithful to our responsibilities in sensing, grasping, and forwarding this opportunity to contribute our knowledge and understanding to our country's welfare."

Other officers elected were: First vice president, J. R. Kearney Jr., J. R. Kearney Co., St. Louis; second vice president, William McFee, American Rolling Mill Co., Middletown, O.; third vice president, D. Clinton Grove, advertising manager, Blaw-Knox Co., Pittsburgh; and secretary-treasurer, Frank Wyse, Bucyrus-Erie Co., Milwaukee.

In addition to these officers, the following directors were elected: E. S. Lawson, Foxboro Co., Boston; Stuart G. Phillips, Dole Valve Co., Chicago; George Mathews, Lukenheimer Co., Cincinnati; E. B. Bossart, Bailey Meter Co., Cleveland; A. J. Andrews, Bucyrus-Erie Co., Milwaukee; Charles McDonough, Combustion Engineering Co., New York; A. O. Witt, Schramm Inc., Philadelphia; C. C. Tapscott, McQuay-Morris Mfg. Co., St. Louis; and Theodore Marvin, Hercules Powder Co., Wilmington, Del., who was re-elected director at large.

Leaders Discuss Marketing

In the Sept. 20 morning session various phases of industrial products advertising were discussed by C. J. Stark, president, Penton Publishing Co.; T. C. Fetherston, manager of the technical publicity department, Union Carbide Co.; Frank L. Avery, managing director, Controlled Circulation Audit; Ralph Leavenworth, general advertising manager, Westinghouse Electric & Mfg. Co.; Roland G. E. Ullman, president, R. G. E. Ullman Associates; and O. C. Holleran, industrial marketing specialist of the bureau of foreign and domestic commerce.

Republic Campaign Best

FOR the most outstanding advertising campaign of the year in the field of metals, Republic Steel Corp. was awarded first prize by judges at the thirteenth annual conference of the National Industrial Advertisers association.

S. A. Knisely, advertising and sales promotion manager of Republic, states that the prize-winning campaign was created and placed by G. M. Basford Co., industrial advertising agency, of New York and Pittsburgh.

Hook Sees Housing Employing 8,000,000

MORE than 5,000,000 persons now on relief rolls will be absorbed directly by building activity and 3,000,000 more indirectly, declared Charles R. Hook, president, American Rolling Mill Co., Middletown, O., recently, when the Briggs Mfg. Co., Detroit, entertained nearly 200 Michigan architects, representing a large section of the membership of the Michigan Society of Architects.

Sensing a revival of building, Briggs has developed a plumbing ware division to tie in with what Ward M. Canaday, assistant federal housing administrator, forecast at the meeting "will be one of the biggest building booms in history." This boom, according to Mr. Canaday, will emphasize new standards in home comforts and conveniences, including more modern heating, refrigeration and plumbing—all possible outlets for steel. Development of drawn metal plumbing, claimed to be one-third the weight of cast iron and permitting new coloring and styling, will completely change the mode in bathrooms and kitchens, declared John A. Callahan, manager of the plumbing ware division of the Briggs company.

Building boom smiles, left to right, by Clair W. Ditchy, president, Michigan Society of Architects; Ward M. Canaday, assistant federal housing administrator; John A. Callahan, general manager, plumbing ware division, Briggs Mfg. Co., Detroit; Charles R. Hook, president, American Rolling Mill Co., Middletown, O., and Joseph Dodge, president, Detroit Savings bank

August Foreign Trade Declines

DUE partially to a decline in scrap, exports of iron and steel in August were 16.7 per cent below the July volume, according to the metals and minerals division of the bureau of foreign and domestic commerce Washington. August exports totaled 247,312 tons. Notwithstanding a decline of 24 per cent, scrap at 156,685 tons remained the chief commodity shipped abroad.

August imports, totaling 31,312 tons, were 582 tons below July and represented the third consecutive monthly decrease. The receipt of foreign iron and steel in the January-August period, at 246,097 tons, registered a gain of 13.2 per cent over the comparable period of last year.

Decreases occurred in exports in 35 classifications, and increases in 28. Iron ore shipments to Canada gained.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1935		1934	
	Imports	Exports	Imports	Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	28,905	228,537	25,407	151,184
Mar.	21,409	323,035	38,393	261,269
April	28,866	205,336	26,862	201,539
May	47,719	286,598	29,465	241,753
June	33,208	289,687	24,848	219,406
July	31,894	296,802	17,676	233,186
Aug.	31,312	247,312	32,418	242,947
8 mo.	246,097	2,140,048	217,715	1,629,314
Sept.	.....	.....	23,847	301,330
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,764

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	August, 1935	July, 1935	Jan. thru Aug. '35
Pig iron	8,568	5,519	67,573
Sponge iron	151	.....	817
Ferromanganese and spiegeleisen (1)	2,382	5,962	30,872
Ferrochrome (2)	.....	.....	1
Ferrosilicon (3)	50	38	606
Other ferroalloys (4)	.....	.....	1
Scrap	2,376	1,584	16,016
Steel ingots, blooms, etc.	194	35	1,261
Concrete bars	481	721	2,010
Hollow bar, drill steel	110	102	683
Merchant steel bars	93	477	8,400
Bars—solid, hollow (6)	2,329	1,776	7,186
Iron slabs	.....	.....	.....
Iron bars	228	284	1,146
Wire rods	801	937	8,912
Boiler and other plate	141	79	387
Sheets, skelp, saw plate	670	681	5,333
Tin plate	32	5	138
Structural shapes	4,521	3,122	25,124
Sheet piling	.....	.....	.....
Rails and fastenings	458	819	2,921
Cast iron pipe, fittings	.....	.....	27
Malleable iron pipe fittings, advanced	.....	.....	46
Welded pipe	293	492	1,700
Other pipe	610	1,777	10,503
Cotton ties (5)	1,000	2,211	4,954
Other hoops and bands	1,079	1,290	13,443
Barbed wire	1,656	1,390	16,368
Round iron and steel wire	251	224	2,659
Telegraph and telephone wire	1	3	21
Flat wire, strip steel	249	65	1,117
Wire rope and strand	156	138	1,214
Other wire	127	187	751
Nails, tacks, staples	2,112	1,841	12,445
Bolts, nuts, rivets	1	28	227
Horse and mule shoes	64	35	445
Castings and forgings	128	72	790
	31,312	31,894	246,097

(1) Manganese content.
(2) Chrome content.
(3) Silicon content.
(4) Alloy content.
(5) New class. No comparable figures for 1934 or previous years.
(6) New classification as result of reciprocal trade agreement with Belgium. No comparable figures for previous month or year.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	August, 1935	July, 1935	Jan. thru Aug. '35
Pig iron	570	122	2,113
Ferromanganese and spiegeleisen	2	4	41
Iron and steel scrap	156,685	205,779	1,481,132
Tin plate scrap	2,779	2,957	28,168
Waste-waste tin plate	1,417	1,100	15,289
Ingots, blooms, etc.	3,657	1,718	33,655
Bars, iron	52	44	710
Bars, steel	3,545	5,993	35,455
Bars, alloy steel	191	152	1,523
Wire rods	2,692	2,824	16,678
Boiler plate	185	207	1,018
Other plate, not fab.	3,503	3,303	24,512
Skelp, iron or steel	12,117	10,500	29,383
Iron sheets, galv.	110	343	1,176
Steel sheets, galv.	5,060	7,235	50,167
Steel sheets, black	7,840	7,506	68,716
Iron sheets, black	403	278	3,617
Strip steel, cold-rolled	1,649	1,574	12,041
Strip steel, hot-rolled	2,207	2,053	16,774
Tin plate, taggers' tin	12,430	9,639	76,118
Terne plate	148	46	1,551
Tanks, except lined, etc.	611	716	4,319
Shapes, not fab.	2,767	2,963	20,645
Shapes, fabricated	860	1,692	11,966
Plates, fabricated	18	98	954
Metal lath	123	51	535
Frames, sashes and sheet piling	123	113	3,367
Rails, 50 lbs. and over	7,600	7,065	31,899
Rails, under 50 lbs.	195	546	2,878
Rail fastenings	434	625	3,662
Switches, frogs and crossings	177	86	906
Railroad spikes	156	211	1,675
Railroad bolts, nuts	36	35	314
Boiler tubes, seamless	595	374	5,414
Boiler tubes, welded	72	102	508
Casing and oil-line pipe, seamless	1,309	2,441	15,225
Casing and oil-line pipe, welded	60	103	3,670
Seamless blk. pipe, other than casing, etc.	101	104	1,889
Malleable iron screwed pipe fittings	491	249	2,330
Cast iron screwed pipe fittings	174	74	1,201
Cast iron pressure pipe and fittings for	849	423	5,743
Cast iron soil pipe and fittings for	169	373	2,507
Welded black steel pipe	1,032	1,228	11,595
Welded black wrought iron pipe	161	66	1,550
Welded galv. steel pipe	1,122	1,300	12,250
Welded galv. wrought iron pipe	70	66	660
Riveted iron or steel pipe and fittings	48	16	310
Plain iron or steel wire	1,517	1,170	10,505
Galvanized wire	2,383	1,383	14,627
Barbed wire	2,623	3,547	20,871
Woven wire fencing	178	358	1,413
Woven wire screen cloth	96	100	710
Wire rope	260	329	2,797
Other wire and mfrs.	399	620	3,476
Wire nails	962	1,277	7,110
Horseshoe nails	31	40	391
Tacks	32	29	263
Other nails, including staples	236	343	1,841
Ordinary bolts, mach. screws, rivets, washers	469	536	4,273
Iron castings	499	1,344	6,234
Steel castings	209	371	1,837
Car wheels and axles	285	430	12,122
Horseshoes	21	21	142
Iron and steel forgings, n. e. s.	317	405	3,627
Total gross tons	247,312	296,802	2,140,048

Dawes Stands on Steel as Indicator

THE sustained rise in stock exchange prices this year, followed by the start of a similar upturn in production of steel ingots, marked the beginning of business recovery just as similar events heralded the passing of the major depressions of 1873 and 1893.

These parallels were brought out by Gen. Charles G. Dawes in connection with his views on a new method for the study of depressions and the lessons to be gained from them, as presented before a joint meeting of the Chicago Association of Commerce and the Illinois Manufacturers' association at the Stevens hotel, Chicago, Sept. 26.

General Dawes, former United States vice president, banker, and prominent in national and international affairs, but little known as an economist or business forecaster, attracted considerable attention last December by his prediction that June or July of this year would see a sudden sustained rise in the demand for heavy durable goods. The contra-seasonal upturn in steel production, starting on July 5, is pointed to by the general as fulfillment of this prognostication.

Explaining that a comparison of the duration of the two former depressions of 1873 and 1893 provided him with the basis for his opinion regarding the extent of the latest depression, General Dawes stated that his definite prediction was made in order to call public attention to what he considers a new and useful method of investigation.

Discarding the different theories of over 50 authors of economic works, General Dawes started with the as-

(*Please turn to Page 50*)

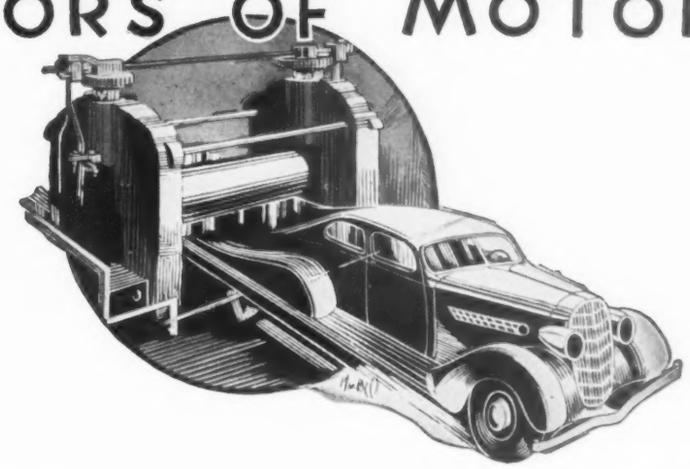
ORIGIN OF AUGUST IMPORTS

Gross Tons

	Pig iron	Manganese ore	Ferromanganese
Germany	225	17	.....
Netherlands	126	.....	80
Russia	500	4,587	.....
Sweden	100	.....	.....
United Kingdom	160	.....	232
Canada	2,953	102	1,373
British India	4,504	4,907	.....
Cuba	.....	4,776	.....
Brazil	.....	446	.....
Chile	.....	52	.....
Gold Coast	.....	3,626	.....
France	.....	.....	99
Norway	.....	.....	605
Total	8,568	18,513	2,389

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
United Kingdom	4	1	210	12
Belgium	507	3,379	993	341
Germany	87	257	276	236
Sweden	11	.....	309	.....
Canada	1	.....	.....	.....
France	.....	884	530	490
Czechoslovakia	.....	.....	1	.....
Poland	.....	.....	103	.....
Total	670	4,521	2,422	1,079

MIRRORS OF MOTORDOM



DETROIT

MICHIGAN leads, so statisticians claim, in the production of automobiles, cherries, peppermint, and cantaloupes, and by the time all of the 1936 automobile models are announced it probably also will lead in superlatives.

Not having many mechanical changes to proclaim, advertising copywriters are being driven to paeans of praise over beauty. Beauty of interior appointments, beauty of new radiator grilles, beauty of greater streamlining in bodies—it is a dizzy whirl of beauty, and imaginations are being beggared in quest of expressive substitutes for that word beauty.

And Still More Beauty

Dodge, for example, is trying to ignite the enthusiasm of its salesmen by describing the forthcoming models as "the most fashionable, most strikingly beautiful of all Dodge cars . . . sheer, breath-taking beauty . . . sets the pace for all 1936 cars with sensational new style and smartness . . . the beauty winner of 1936."

DeSoto has been suspecting that its new radiator grille, streamlined circular louvres and fine interior appointments would make it the most beautiful car for 1936. Buick officials have gazed fondly at their new Special, Century, Roadmaster and Limited models, just now being shown, with an appropriate swelling of the chest.

With justifiable pride have Hudson-Terraplane executives stolen admiring glances at their new series, believing their new front end is a pacemaker in styling. Hupp has put more money than ever into interior trim. Ford, Pontiac, Olds—well, name any automobile at random and you have "the most beautiful job of the season."

And, truth be told, only a man with a cold eye and a flat pocketbook can scan most of the new models without becoming covetous.

Speaking of Dodge, on which production is now under way but no announcement probably will be made before the third week of October, the most striking exterior change is the adoption of a die-cast radiator grille. The V in the center is a series of unbroken vertical lines; the vertical lines on both sides are broken by four horizontal bars.

Louvres, fenders, and body lines otherwise are unchanged. Of course, the general appearance is more trim because of the new steel top.

Headlamps, which are torpedo shaped, are mounted on windstream supports which blend into the hood louvres. These supports also are housings for the horns and match the lines of the radiator grille.

The frame, which has been completely re-designed, is ½-inch deeper, the side channels being 5½ inches deep, with 2-inch flanges. The frame box sections have been extended; the frame is slightly lower and claimed to be twice as rigid; new insulation has been inserted between the body and the frame.

The semi-elliptic springs, used front and rear, are slightly longer, and metal covers are standard on the rear springs. Kick shackles are used on the front springs. Axle shafts are Amola steel. The emergency brake has been mounted on the frame.

Instrument Panel Is New

The engine remains a six, with a bore of 3¼ inches, stroke of 4⅜ inches, piston displacement of 217.8 cubic inches, compression ratio of 6.5, and taxable horsepower of 25.35—all unchanged from 1935. Improved automatic choke action has been installed. The wheelbase, now 116¼ inches, is ¼-inch longer.

The new instrument panel is finished in a light shade of walnut and set off by three horizontal bars. In the center third of the panel is an exceptionaly large speedometer, and around it in small oblong panels are grouped the oil gage and ammeter at the right, and heat indicator and fuel gage at the left. The panel is indirectly illuminated for night driving. On each side of these indicators are ash receivers, one of which can be removed to provide a special panel for radio dials.

Newly-designed rear quarter windows of the sedan and four-door touring sedan now open outward instead of vertically. The front seats of the two-door sedan and the two-door touring sedan models provide a solid cushion extending the full width of the car; the seat back is divided in the center and may be tilted forward, or the entire seat can be moved forward to facilitate access to the rear.

A built-in foot rest on all four-door sedans and touring sedan models is recessed into the rear of the front seat. A new silk robe cord is kept in constant tension by springs in socket mountings. Sedans without trunks have a luggage compartment back of the rear seat.

"Safety Circle of Steel"

Dodge is going to do much talking about "balanced driving control," an improved "airglide ride," the ability to operate clutch and brake pedals with the tips of toes, and easier steering through an improved ride levelator and fore-and-aft steering.

Since other manufacturers pioneered the all-steel top, Dodge will emphasize the "safety circle of steel"—steel on all sides.

The October schedule of Dodge is 18,000.

Hupp will display 1936 models to its field men this week. There will be a touring sedan, a standard sedan, and a coupe on both the six and the eight chassis.

While the general hood and body lines of the 1935 Hupp are retained, there is more of a taper in the hood toward the narrower radiator grille, which is of the new die-cast type. A transmission overdrive is optional. The top continues soft. More expensive upholstering is being used.

Material is being released for the first run of 2500 new Hupps, expected to be completed in October in order that dealers may be stocked by

the opening of the New York show Nov. 2. The present management (Verne Drum, president) has won the most-recent stockholder squabble, and the year opens auspiciously.

The year, in fact, is opening for most other manufacturers. This is evidenced by the fact that last week's assemblies, totaling 15,994 units, represented improvement over the 12,600 turned out in the week ended Sept. 21, which probably was the bottom of the changeover period.

Last week both Ford and Chevrolet were closed, so far as actual assemblies were concerned, although departments were speeding the manufacture of their particular parts. Ford may produce some new models this week.

Chevrolet may not begin assembling for another week or ten days, and is not expected to announce prior to the New York show. Incidentally, Chevrolet is the only General Motors unit not going to a die-cast radiator grille this year, probably on account of the cost, and this retains probably a million grilles for pressed steel for 1936. Chevrolet has bought material for the initial run of 250,000 jobs—its largest opening buy.

To Talk Delivered Prices

Buick, which last Wednesday formally announced its four series, has got production up over 3000 units a week. While its national advertising mentions f.o.b. Flint prices, try and get a dealer to mention them. Buick dealers are going to talk delivered prices only, believing that prospects are only antagonized by learning of additions to make up the delivered price

In Detroit, the 4-door sedan in the various models delivers for $1056, $1299, $1484, and $2198. Much is made of Buick reductions, ranging from $10 to $385, but the impact on the $1000 market, where Buick expects to make its killing, will not be great; the reduction there is $10 in the 4-door sedan. The biggest cuts are in the slower-selling higher-price series. Buick's program for 1936 is 135,000.

Pontiac now is in production on its 1936 series, making over 1000 last week, in which the chief change is a narrowing and refinement of the front end, including a new radiator grille. Pontiac is starting up its foundry at Pontiac, which has long been idle. For one thing, Pontiac expects too big a year for Chevrolet to be able to make the needed engine blocks at Flint, and for another, Chevrolet can use most of its foundry capacity for its own jobs.

The lowest bid for casting the Pontiac block is said to have been a few cents under $8, which the Pontiac foundry, which was in operation only a few weeks before the depression closed it, undercut. Pontiac has taken a high-price foundry expert from Chrysler. It will be the end of the year before large-scale operations in the foundry will be attained.

Buick continues to make the Olds six block in its foundry at Flint, but may not be able to keep the job in event it attains its expected production of Buick blocks. In that case, it is reported, the Buick foundry may take over the casting of the Olds eight block and turn over the Olds six block to a Muskegon foundry.

Assembly Lines Rolling

Last week Hudson-Terraplane showed handmade models to distributors, and this week actual production begins. It claims to be opening the model year in the best financial position in many years, having almost $10,000,000 in cash.

Packard staged a driveaway of demonstrator cars—about 1700 of them—last week, making it one of the largest in history. For 1936 cars its schedule is 70,000 of the small job and 9000 of the large. Its production last week was 1300.

Olds also got under way last week, rolling about 1200 new models—comparatively little changed—off the line. Cadillac has started sampling dealers, and possibly this week will ship out the first new LaSalles. Smoothing out front and rear lines, including new grilles, is the chief improvement.

If General Motors has a soul it will strike off three medals after all 1936 models have been introduced. One will be for the man who devised the die-cast radiator grille for the 1935 Olds, which so many have now copied, the second will be for the Olds executive who recommended it, and the third for his superior who approved it.

A change in bearings is being made by some automobile manufacturers who pushed the cadmium-silver type in 1935. While these bearings had certain admirable qualities, acids in lubricating oils have been hard on them.

Some oils, especially the asphalt base type, are said to contain natural acids such as the naphthenic acids produced by the oxidation of various hydrocaloric elements in oils.

Still worse on these bearings have been some of the lighter oils pushed for winter driving. In one solvent process for making these light oils crecylic acid and liquid propane are used. Other processes use phenol (carbolic acid), nitrobenzene, and furfuraldehyde. These are used to flatten out the viscosity curve.

In any event, corrosion of these bearings has been induced by the acids in "lubes," a good many investigations have been made, and the old copper-lead combinations look pretty good after all.

Trying Times for Suppliers

Notwithstanding the fact this is not a year for marked basic changes, suppliers have rarely had so hectic a time. Factories release materials and parts, then hold them up the next day, then in a few days fume because the mills did not proceed anyway and build up material and parts for rush delivery. National magazines, too, have been unusually delayed in obtaining releases of copy for announcements.

Studebaker stock took a nice ride recently on the strength of hints of something extremely radical, which is now denied . . . . Willys starts this week on its last run, unless the court relents . . . . Railroads expect to move 92,361 carloads of autos, parts and tires in the fourth quarter this year, an increase of 154 per cent over the fourth quarter of last year (36,239), due chiefly to earlier showing of models.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,321
July	229,357	264,933	337,044
Aug.	232,855	234,811	240,051
8 mos.	1,442,326	2,214,007	2,839,240
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

Estimated by *Cram's Reports*

Week ended:

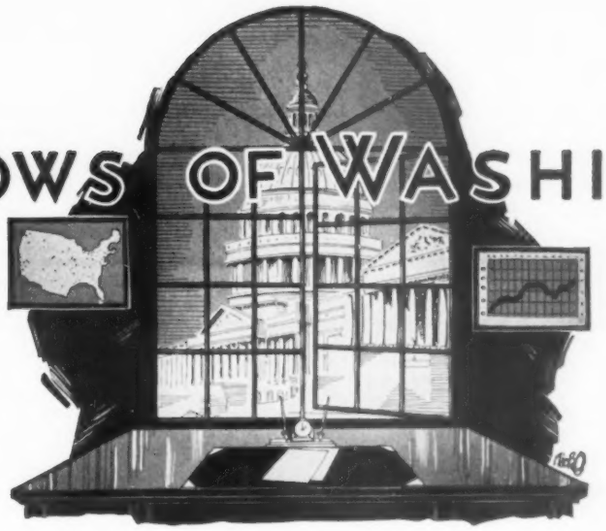
Sept. 7	34,140
Sept. 14	13,470
Sept. 21	12,600
Sept. 28	15,994

Youngstown Industrial Marketers Organize

Thirty-five advertising and sales executives in the Youngstown, O., district have organized the Youngstown District Industrial Marketers. For the remainder of the year officials are: President, S. A. Knisely, Republic Steel Corp.; first vice president, R. P. Dodds, Truscon Steel Co.; second vice president, R. E. McClure, McClure & Wilder Advertising Agency; secretary, Park Meek, Meek & Wearstler Advertising Agency, and treasurer, R. S. Gildart, General Fireproofing Co.

Meetings are usually held the first Friday evening of each month, preceded by dinner. The October meeting will be held Saturday afternoon, Oct. 5, and includes a golf tournament at the South Hills Country Club, Youngstown.

WINDOWS OF WASHINGTON



WASHINGTON

THE PRESIDENTIAL MIND evidently changes from time to time. Just before leaving for his Pacific coast trip last week, President Roosevelt at his press conference stated definitely that he had not decided whether to ask for permanent NRA legislation at the next session of congress. He said that would be up to industry.

This is diametrically opposite to the letter he sent to congress on the Saturday before adjournment, in which he stated definitely that he would ask for NRA extension. This was mentioned quite fully in this column last week.

Discussing the NRA situation, the President stated that reports reaching him via NRA are to the effect that in most of the major industries code standards are being upheld, but there are chiselers in every industry. He said that some 90 per cent of every industry is trying to hold up labor standards of both hours and wages.

Puts Industry on Honor

The President spoke of the surveys being made by the NRA field force, which he said would be used later as a basis for discussion to prevent certain conditions inimical to business, such as long hours, child labor and low wages.

It was pointed out by the President that if industry itself can adjust these matters that there is "absolutely no reason for asking for additional legislation along these lines by congress."

The Walsh government contract bill, he further stated, is in the same category. If something can be done about the chiselers in industry it will not be necessary to have this legislation either, he said.

The President observed when the whole case is in and before any recommendation is made to congress for legislation on the subject, he is going to say to industry of the country: "What do you propose to do about it."

The whole trend of his talk at the conference led to the conclusion that he has definitely changed his mind, and while he was strong for continuing this body a short time ago he is willing to do without it, or at least has an open mind as to whether NRA should be continued or not.

Three things are happening at NRA these days. Code histories are being written for the future archives of the United States; major and minor industry "studies" are being made, of which the steel industry is one; and the personnel of the organization is gradually being cut down.

Feel NRA Is Gone

The real thinkers at NRA, that is, those who are left, do not honestly believe that the next congress wi l continue NRA as a permanent body. They feel that by that time business will be so good industry will not want to risk its neck again.

In connection with the industry surveys, one NRA official, who refuses to be quoted but who has a long background in the organization and knows what it is all about, states that the board of review wants to present a factual analysis of these industries of actual conditions. In no case, he says, is there any intention to obtain data for the purpose of supporting any preconceived economic or social theory.

This same official calls attention to the fact that the division welcomes a frank discussion of the problem of any industry with those who are most intimately connected with its operations.

He says that co-operation includes an opportunity for industrial groups furnishing data to criticize the method of use of such data or conclusions reached therefrom. He believes that this attitude should be welcomed by industry and should form the basis for close co-operative work.

ROPER BUSINESS COUNCIL STAYS, BUT HOW LONG?

There is a great deal of backstairs gossip at the department of commerce as to whether or not the Roper business advisory council will be continued after October. The steel industry is represented on this body by Myron C. Taylor, chairman of the United States Steel Corp.

It is admitted by everyone who knows anything about the situation that the council would pass into the discard if it were not for the personal feelings of Secretary of Commerce, Roper, who would undoubtedly take its abolition as a slap in the face.

Members of the council, good Democrats and all, are disgusted with the way they have been treated. They have put in a lot of time and effort for the past two or three years on certain reports, which were handed over to Mr. Roper, who in turn was to transmit them to the President.

In no cases have the reports been made public, although there have been press "leaks," but in all cases apparently the reports have been filed in the presidential waste basket.

Anyhow, the story is that if any more members resign that they will be replaced by Democrats who will remain on the body until Mr. Roper sees fit to say that the usefulness of the organization has passed.

SOVIET TOOL BUYERS DEPART

It appears that the great urge of the Soviet government to buy machinery and other commodities in these United States is at an end.

Without making any fuss about the matter, commercial advisors who have been attached to the Russian embassy in Washington for many months are being slowly withdrawn.

This apparently means only one

thing, that the end of Russian buying in this country is in sight. No official statement has been issued with regard to the return of these commercial experts to their own country.

Incidentally, at no time has the United States been represented in any part of Russia by commercial attaches or trade commissioners since the re-establishment of our diplomatic relations.

LABOR CLAUSES NOW OPTIONAL IN TRADE AGREEMENTS

President Roosevelt has issued an executive order putting labor provisions in trade practice conference rules, and another designating Maj. George L. Berry, labor executive, as co-ordinator for industrial co-operation in NRA.

In connection with the latter, Major Berry is appointed "to supervise, subject to direction of the President, conferences of representatives of industry, labor and consumers, for consideration of best means of accelerating industrial recovery, eliminating unemployment and maintaining business and labor standards."

The trade commission is interpreting the new order as providing that industry can ask for trade practice conferences either with or without labor provisions. If without labor provisions, they come under the old commission procedure, but if with labor provisions industry is entitled to such protection from the Sherman law as it might get under the recent resolution continuing NRA.

Under the trade commission agreement, rules are to be approved by the commission only, but those containing labor provisions are to be approved by the President, inasmuch as any labor provisions in the agreement will come under Major Berry and not under the commission.

Major Berry states: "It is my belief that management and employes in all industries want a fair trade practice law. Perhaps they are more keenly appreciative of its necessity today than they were six months ago. It will be my task to identify the facts with relation to the attitude of management and employes as it relates to the value of the national recovery act and their position as it relates to the matter of establishing a permanent institution."

GRADE CROSSING STEEL SOON

The steel industry should be getting some results from the grade crossing program soon, because all of the restriction and regulations which have been holding this up for so long have been removed.

The President stated at his press conference last week that he has assumed that the program had been going ahead all along. One of the newsmen told the President that "only one grade crossing has so far been completed." The President expressed surprise at this but stated that he understood the program was ready for immediate action now.

It is reported that some of the states have submitted their proposals and been turned down for one reason or another. Other states have not yet submitted their grade crossing programs.

WEIGH WIRE ROPE PACT

While officials of the federal trade commission are cagey about what is happening to their trade practice conferences, if anything, it is understood on good authority that wire rope and strand manufacturers have agreed among themselves as to what should be in their proposed trade agreement.

The agreement is said to be in Washington, where it is being gone over by the board in charge of these agreements. When it has finally decided if it is O. K., the board will recommend to the commission that a general trade practice conference be held. When and if it is held, this will be public. No date has yet been set for such a conference.

Production

STEELMAKING eased 1 point last week to 51 per cent, which may be attributed to delays in automotive releases, particularly for sheets and strip. However, this lull is believed to be only temporary. Pittsburgh, Youngstown, eastern Pennsylvania, Cleveland and Detroit held steady; Chicago, Wheeling and New England decreased, while Birmingham and Buffalo gained. Further details:

Youngstown — Unchanged last week at 54 per cent, and tentative schedules indicate a holding of this rate this week.

New England—Off 13 points to 55 per cent last week. Indications are for a gain of several points this week.

Chicago — Declined less than 1 point to 59 per cent, an increase in schedules by one interest nearly offsetting a reduction by another. Only small revisions in steelmaking are in prospect for the next few weeks. Blast furnace schedules are steady, with 13 of the district's 36 steelworks stacks active.

Central eastern seaboard — Unchanged at 35½ per cent last week, with indications of a mild improvement this week as two or three scattered units are expected to go into operation. However, the decline in tin plate specifications is being felt and, at the moment, there appears to be a rather general recession in finished steel releases. Producers, however, regard this recession as temporary and believe that by the middle of October heavier tonnage will be moving, notwithstanding continued poor outlook in the railroad field, and a far below normal volume of building.

Wheeling — Down 3 points last week to 81 per cent, reflecting only a minor drop, inasmuch as one leading producer continues at capacity. Thirty out of 37 open-hearth furnaces are on schedule, compared with 31 on a week ago.

Pittsburgh — Unchanged at 46 per cent last week, owing to a steady rate of production by the two leading interests at around 40 and 55 per cent, respectively. After a week's idleness, a district open-hearth plant of an independent mill has again resumed. The steel ingot rate cannot look for improvement from the tin plate rolling mills over the near future, but automotive requirements may prove the basis for an early gain.

Twenty-four out of 60 steelworks blast furnaces were in blast last week, although the open hearths of a leading interest are now taking in more iron in preference to scrap. Carnegie has 10 of 32 on; Jones & Laughlin, 7 of 11; Bethlehem, 3 of 7, and National Tube, American Steel & Wire, Pittsburgh Steel, and Pittsburgh Crucible Steel, one each.

Cleveland-Lorain — Steady at 67 per cent, National Tube Co. operating 12 open hearths, Corrigan, McKinney Steel Co., nine, and Otis Steel Co. five. The Cleveland steel bar mills operated at 50 per cent; sheet mills at capacity, and strip mills at 75 per cent.

Birmingham — Increased 5½ points to 55½ per cent last week, as additional open hearths were put in operation. Fabricators report numerous small lot orders. This rate will probably be increased when new rail business is released.

Buffalo — Jumped 10 points to 47 per cent last week, with 18 furnaces in production. This rate is expected to be maintained this week, although one or two additional furnaces are scheduled to be added to the active list should demand hold.

Detroit—Held at 94 per cent, one producer continuing with all eight active and another with 8 out of 9.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Sept. 28	Change	Same week 1934	Same week 1933
Pittsburgh	46	None	17	30
Chicago	59	— ½	26	48
Eastern Pa.	35½	None	17	31½
Youngstown	54	None	28	54
Wheeling	81	— 3	31	56
Cleveland	67	None	28	54
Buffalo	47	+10	24	48
Birmingham	55½	+ 5½	25	34
New England	55	—13	31	75
Detroit	94	None	77	45½
Average	51	— 1	25	38

Industrial Men in the Day's News

J. D. Jones, Chief Engineer, Youngstown Sheet & Tube Co.

He has had many years of experience in leading steel producing districts of the Middle West.

Since 1912, the major portion of his time has been spent with a Canadian steel company at the Soo.

There he was general superintendent since 1919, resigning last August to go to Youngstown.

J. D. JONES, recently appointed chief engineer of the Youngstown Sheet & Tube Co., Youngstown, O., was born and raised in Pittsburgh and went to school at Pittsburgh academy.

From the outset he was interested in steel, and set out at once to obtain a wide range of experience in its production. He worked in steel plants in Wheeling, Chicago, Buffalo, Pittsburgh, and other cities.

In 1912 he went to Sault Ste. Marie, Ont., as chief engineer of the Algoma Steel Corp. In 1916 he went to the Gary, Ind., works of Illinois Steel Co. as chief engineer, and left there in the latter part of 1919 to return to the Algoma plant at the Soo as general superintendent, later becoming general manager and vice president. He came to the Youngstown Sheet & Tube Co. early in August.

Mr. Jones is a member of the American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, Engineering Institute of Canada, American Iron and Steel institute, and the British Iron and Steel institute.

♦ ♦ ♦

James S. Ogsbury has been elected vice president and comptroller of Whitman & Barnes Inc., Detroit, twist drills, reamers and special tools. Until recently he has been associated with subsidiaries of International Business Machines Corp. in various executive capacities.

♦ ♦ ♦

J. T. Dillon Jr., president, Struthers-Wells-Titusville Corp., Titusville, Pa., has been elected president of the Steel Heating Boiler institute. Other officers include Homer Addams, president, Fitzgibbons Boiler Co., Ogdensburg, N. Y., and W. R. Meikle, vice presidents; and R. A. Locke, Middletown, Pa., secretary. Directors include Messrs. Dillon, Addams and the following: J. R. Collette, vice president, Pacific Steel Boiler Corp., Detroit; Charles Crouse, vice president National Radiator Corp., Johnstown, Pa.; R. B. Dickson, president, Kewanee Boiler Corp., Kewanee, Ill.; F. B. Metcalf, president, International Boiler Works Co., East Stroudsburg, Pa.; H. H. Peek, president, Lookout Boiler & Mfg. Co., Chattanooga, Tenn.; John Trefts, president, Farrar & Trefts Inc., Buffalo, and C. N. Tull, president, Spencer Heater Co., Williamsport, Pa.

Walter H. Gardner

Who as noted in STEEL for Sept. 16 has been appointed general sales manager of Keystone Steel & Wire Co., Peoria, Ill., effective Oct. 1. He has been manager of the special sales division of Caterpillar Tractor Co., also of Peoria

♦ ♦ ♦

Raymond S. Simmons has been named executive head of the metallurgical department of Keystone Steel & Wire Co., Peoria, Ill. From 1915 to 1919 he was metallurgist at the Gary, Ind., works of Illinois Steel Co., and from 1919 to 1935 chief of metallurgical and inspection departments of the Pittsburgh Steel Co., Pittsburgh.

Raymond S. Simmons

♦ ♦ ♦

James B. Allington has been appointed to the sales force of Blaw-Knox Co., Pittsburgh, and will specialize in sales and service work in connection with the gas conditioning division of the company. For 15 years he has been industrial sales engineer for Rochester Gas & Electric Co., Rochester, N. Y.

♦ ♦ ♦

V. L. Sanderson has been appointed sales representative for the American District Steam Co., North Tonawanda, N. Y., with headquarters in Philadelphia. His territory includes Philadelphia and Delaware.

♦ ♦ ♦

Charles M. Reesey, advertising manager of Cincinnati Milling Machine Co. and Cincinnati Grinders Inc., Cincinnati, has been named head of the Cincinnati Association of Industrial Marketers, succeeding

Alexander Thomson Jr., resigned.

W. D. Shannon, Allis-Chalmers Mfg. Co., has been named to a vacancy on the board of directors of the association.

♦ ♦ ♦

Alfred A. Corey Jr., president of the Vanadium Corp. of America, has resigned.

Ward A. Miller, vice president, is acting chief executive.

Dr. B. D. Saklatwalla, vice president and director, has resigned to form a new organization for research and development in new steels and alloys, as noted in STEEL last week.

♦ ♦ ♦

William P. Ewing, formerly general manager of sales, Superior Steel Corp., Pittsburgh, has been elected vice

William P. Ewing

president in charge of sales, succeeding the late J. E. Whetzel.

♦ ♦ ♦

C. L. Dunbar has been elected president of Page-Hersey Tubes Ltd., Toronto, Ont., succeeding the late Hon. H. C. Schofield.

♦ ♦ ♦

Dr. John S. Unger, manager of the research bureau, Carnegie Steel Co., Pittsburgh, retires under compulsory pension Oct. 1. He has been a Carnegie employe continuously for 48 years, first as assistant chemist at the Edgar Thomson works, later assistant superintendent at the Homestead armor plate department, then becoming superintendent in 1897. He became asistant general superintendent of the entire Homestead works in 1905, and has been manager of research since 1908.

♦ ♦ ♦

Charles A. McCune, director and secretary of the Magnaflux Corp., New York, has been named recipient of the Samuel Wylie Miller memorial medal for 1934 of the American Welding society, holding its annual fall meeting in Chicago this week. The medal was awarded "in recognition of Mr. McCune's pioneering in the development and application of fusion welding."

From the position of chief draftsman of the Safety Car Heating & Lighting Co., in 1904, Mr. McCune became assistant engineer and later chief engineer, of the Commercial Acetylene Co., retaining this position until 1916, when he became sales engineer of the Page Steel & Wire Co. In 1924 he was appointed director of research of the American Chain Co. and, after holding this position for six years, resigned in 1930 to become director of research of the Welding Engineering & Research Corp. Following the dissolution of this corporation, he assumed his present position with the Magnaflux Corp.

He is one of the founders of the

(*Please turn to Page* 68)

Died:

THOMAS WILLIAM BROOKS, 73, retired steel pipe and tube sales executive, in Oakland, Calif., Sept. 16, after an illness of several months. Born in Mifflin, Pa., as a youth he entered the employ of National Tube Works, Co., Pittsburgh, in 1877, working first in the boiler shop and then in various other departments. He was identified for a time with E. C. Converse, president of National Tube, assisting in the development of the Converse joint for pipe. In 1880 Mr. Brooks went to the Chicago district office where he was in charge of numerous installations in the middle west and western states.

In 1885 he was placed in charge of all pipe laying activities for National Tube, and in 1889 was transferred to the Pacific Coast with Dunham, Carrigan & Hayden Co., San Francisco, sales agent for National Tube. Following formation of United States Steel Corp., National Tube opened district offices at San Francisco and he was appointed assistant manager of sales. In 1911 when sales activities of various Corporation subsidiaries were consolidated into the United States Steel Products Co. he was made assistant manager of sales of the tubular goods department. He remained in that capacity through the acquisition of the Columbia Steel Corp. and the formation of the Columbia Steel Co., retiring Sept. 1, 1931, after 54 years of service.

♦ ♦ ♦

R. L. Chrysler, 48, president of the Liquid Carbonic Corp. of Canada, in Montreal, Sept. 25.

♦ ♦ ♦

Mrs. Myrtle Stevens Bennett, 71, recently president of Wilson & Bennett Mfg. Co., Chicago, manufacturer of steel containers, in Chicago, Sept. 22. In 1909 she founded the company of which she was president until her death.

♦ ♦ ♦

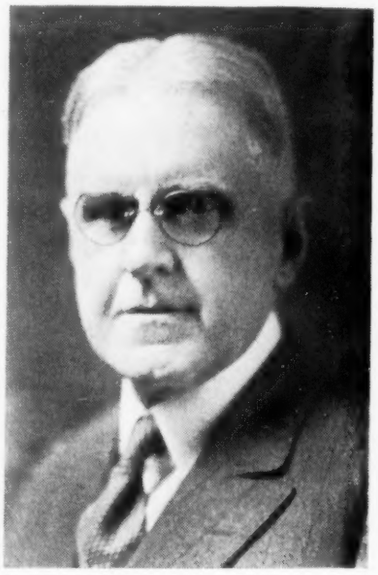
Michael McGrail, assistant general superintendent of the Great Lakes Steel Corp., Detroit, in that city, Sept. 9.

♦ ♦ ♦

Earle P. Hobson, 48, for the past 18 years Cleveland representative for the Cincinnati Galvanizing Co., in Cleveland, Sept. 25.

♦ ♦ ♦

John R. Tillman, formerly in charge of the tool engineering department of the Bullard Co., Bridgeport, Conn., and since last April assistant



Thomas William Brooks

to the vice president in charge of engineering, in Cleveland, Sept. 17, while attending the Machine Tool Show.

♦ ♦ ♦

George T. Richards, 72, retired president of the Drake & Stratton Co., Pittsburgh, bridge and tunnel builder, in Atlantic City, N. J., Sept. 25.

♦ ♦ ♦

Arthur H. Buhl, 57, president of Buhl Sons Co., Detroit, and an officer of the Buhl Steel Co., in Detroit, Sept. 26. He was a leading Detroit industrialist and descendant of a pioneer family in that city.

♦ ♦ ♦

A. F. Brunck, sales manager, Ziv Steel & Wire Co., Chicago, in that city, Sept. 22. One of the oldest and best known tool steel man of the Middle West, he was for the past 18 years actively engaged in the sales of Darwin & Milner steels, for which the Ziv company acts as agent, and was an expert on high-chrome steels.

EDITORIAL

Everything Else Has Failed, Let's Try Common Sense

AFTER two years of experience with the difficult problems of relief and unemployment, the new dealers are beginning to realize that many of their fantastic and expensive schemes are impractical. One after another, the PWA, CWA, FERA, WPA and numerous other alphabetically designated devices for assisting the jobless and other unfortunates have proved ineffectual.

A few agencies, such as CCC, have served a useful purpose, but in the main the combined efforts of the administration to provide relief and employment not only have been disappointing, but in many cases they have made matters worse instead of better.

This charge of failure or near failure is not the propaganda of anti-administration Tories. It comes from persons like General Hugh Johnson, Administrator Hopkins, Rural Resettlement Chief Tugwell, etc., who have been trying to make the new deal schemes work. All of these hardworking officials, within the past few weeks, have made statements indicating that the plans into which the hundreds of millions of dollars have been poured with lavish hand now must be abandoned or changed.

Difficulties Could Have Been Avoided By Heeding the Experience of Other Countries

Much of the trouble and confusion could have been avoided if the early brain trusters and their distinguished leader in the White House had been willing to heed the lessons learned by countries which had experienced problems of relief and unemployment similar to ours. England some years ago went through much of the grief that has confronted the United States and her experience was available to the brain trusters for their guidance. Time and time again leaders in American industry called attention to the lessons learned by England, but Washington was in no mood to listen to Tories. The fair haired boys on the Potomac went on the theory that all knowledge or experience gained prior to March 4, 1933, was archaic and unsound. They must blaze a new trail, regardless of cost or result. They failed to realize, or perhaps did not know, that history shows that men never learn anything from history.

At any rate, General Johnson is thoroughly disgusted with administration methods of unemployment relief. President Roosevelt has permitted Mr. Hopkins to surrender to organized labor on the prevailing wage issue, after having fought vigorously against the McCarren amendment. Mr. Tugwell has turned his back on the rural resettlement plan typified by the notorious Readsville experiment and now is advocating elaborate mass housing projects near large industrial cities—a plan which will prove more embarrassing than the original proposal for rural communities.

The chief defect in all of these grandiloquent schemes is that they tend to rob the unfortunate citizen of his self reliance. They encourage him to depend more and more upon the agencies of government to take care of his needs. They fail to stimulate his initiative to make his own way under the natural competitive conditions of employment in private business. They reek too much of paternalism, and on this score new dealers could profit by studying the activities of the steel industry in welfare work some 30 years ago.

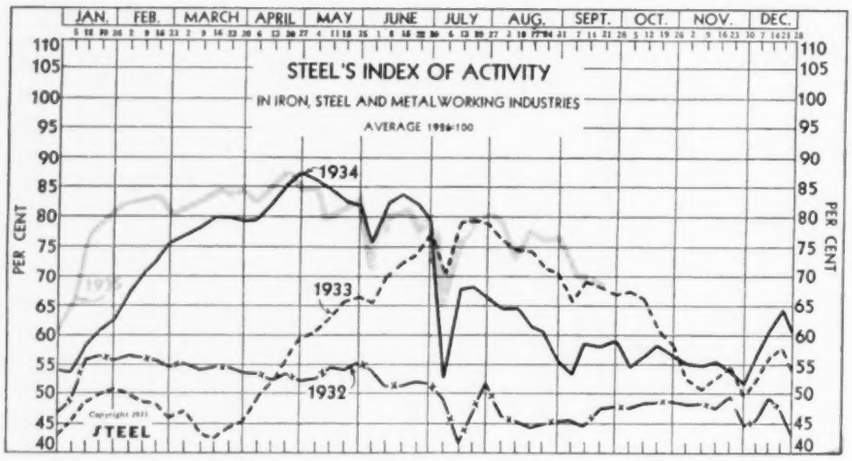
Tendency of Reform Movement Is To Aggravate Already Desperate Unemployment Situation

What is needed above anything else is a realization that millions of the present unemployed cannot be hired profitably, even in good times, unless they are better prepared to hold jobs. A scarcity of skilled workers exists today, while there is a discouraging excess of ordinary unskilled laborers. The very imminence of unemployment insurance, pension plans, etc., will make it still more difficult for the inefficient workers to obtain employment. In other words, the present tendency of the new deal reform movement is to aggravate an already desperate unemployment situation.

The remedy lies in a two-fold action. First, is national machinery for helping employables to find the right jobs and for preparing unemployables for employment. Major Bowes, of radio fame, is doing something along this line when he transfers potential artists from the obscurity of menial jobs to their rightful occupations on stage or screen. Something of this sort might be done for diemakers, automatic machine operators, etc., whose services are in demand right now.

Secondly, the administration should encourage rather than harass private business. This would provide more employment at less cost than any plan the new dealers have proposed or can concoct in the future. It is the only sure path to natural employment.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined 0.7 points to 69.4 in the week ending September 21:*

Week ending	1935	1934	1933	1932
July 13	76.5	67.8	79.1	46.7
July 20	79.8	68.1	79.4	51.5
July 27	80.8	66.4	78.8	46.1
Aug. 3	78.4	64.6	75.9	45.1
Aug. 10	73.4	64.6	74.7	44.6
Aug. 17	77.5	61.4	74.2	44.9
Aug. 24	77.0	60.3	71.6	45.2
Aug. 31	77.3	55.1	70.3	45.4
Sept. 7	70.9	53.5	65.5	44.9
Sept. 14	70.1†	58.7	69.1	47.8
Sept. 21	69.4*	58.1	68.2	48.0

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

Delay in Auto Changeover Slows Business Advance

NOW that the month of September is near its end, it is possible to look back over the third quarter and to seek an explanation for what seems to be a paradox.

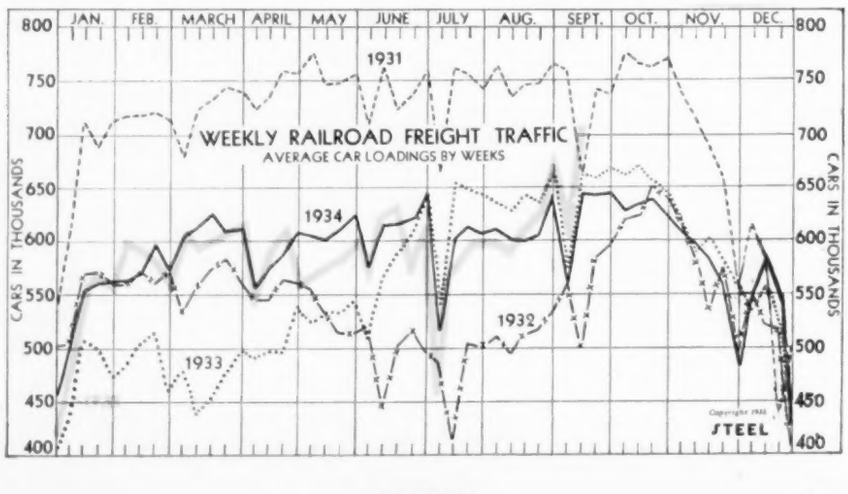
Beginning shortly after July 4 and continuing up to the present time business sentiment has been exceedingly strong. Optimism in well-informed circles ran high throughout this three-month period. Also, a number of important barometers of business activity, such as for instance machine tool orders and electric power output, registered gains of impressive magnitude.

But in spite of these and other highly favorable signs, the actual figures for July, August and September, when weighted and averaged, provide a mean which falls somewhat short of expectations.

Steelworks operations mounted steadily in July and August and have been maintained near 50 per cent or above throughout September. Yet the average for the quarter, while representing a moderate gain over that of the June quarter, will fall short of that of the first three months of 1935. Car loadings, which seemed unable to pick up quickly from the July 4 interruption, finally struck their stride early in September, and at last reports were hovering around the 700,000 mark, which is a gratifying level. Electric power output has been maintained at a record breaking pace for summer months. The output for the week of Sept. 21 was the highest ever recorded with the exception of the third week of December, 1929.

In contrast to these favorable figures, the

1935	
Sept. 14	700,356
Sept. 7	592,786
Aug. 31	679,861
Aug. 24	626,373
Aug. 17	615,006
Aug. 10	583,743
Aug. 3	597,083
July 27	596,462
July 20	593,366
July 13	566,488
July 6	472,421
June 29	618,036



1934	
Sept. 15	647,485
Sept. 8	563,883
Sept. 1	563,883
Aug. 25	606,917
Aug. 18	601,788
Aug. 11	603,968
Aug. 4	612,660
July 28	610,042
July 21	616,040
July 14	602,778
July 7	520,741
June 30	646,003

quarter's record of automobile output is unimpressive. Assemblies dropped from around 80,000 per week in July to a low of 12,600 in the third week of September. This cessation, of course, is due to the changeover from old to new models, but the fact that it continued through August and September was largely responsible for the failure of general business barometers to advance as rapidly as expected in the latter part of the third quarter.

The influence of the automobile situation has been felt in STEEL's index of activity in the metal-working industries. The current figure is slightly under 70, and the average for the quarter will be about 75, compared with 81.1 for the second quarter and 80.0 for the first quarter.

With automobile production being resumed rapidly, the prospect for October is promising. It is possible that general activity throughout industry may register a new top for 1935 in that month.

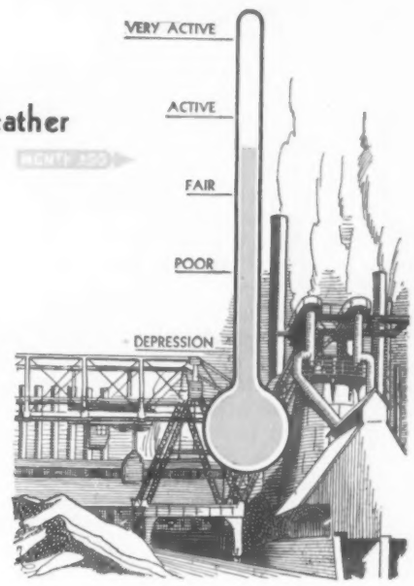
Important in the third quarter was a noticeable trend toward a stable price structure, which in itself is a good indicator of improved conditions all along the line. Another significant development in recent weeks was the reappearance, after a lapse of years, of purchasing of pig iron for investment.

Where Business Stands

Monthly Averages, 1934—100

	Aug., 1935	July, 1935	Aug., 1934
Steel Ingot Output	133.1	107.5	62.2
Pig Iron Output	129.6	111.9	78.0
Freight Movement	105.8	94.1	71.1
Building Construction	169.6	169.7	112.2
Automobile Output	102.7	145.0	101.4
Wholesale Prices	107.7	106.0	102.0

Industrial Weather



Industrial Indicators

	Aug., 1935	July, 1935	Aug., 1934
Pig iron output (daily average, tons)	56,767	49,033	34,199
Machine tool index	112.2	94.7	37.1
Finished steel shipments (tons)	624,497	547,794	378,023
Ingot output (daily average, tons)	108,123	87,316	50,495
Dodge building awards in 37 states (sq. ft.)	21,545,400	21,565,900	14,259,000
Automobile output	247,743	350,118	244,713
Coal output, tons	25,980,000	24,869,000	27,462,000
Business failures, number	910	931	929
Business failures, liabilities	$17,845,596	$20,446,761	$18,459,903
Cement production, bbls.		8,021,000	7,863,000
Cotton consumption, bales	408,022	391,771	604,977
Car loadings (weekly ave.)	626,246	557,184	420,949

Financial Indicators

	Aug., 1935	July, 1935	Aug., 1934
25 Industrial stocks	$177.33	$171.78	$130.46
25 Rail stocks	$27.96	$26.05	$28.19
40 Bonds	$81.93	$82.36	$80.04
Bank clearings (000 omitted)	$22,347,540		$16,132,872
Commercial paper rate, New York (per cent)	¾	1	1
*Commercial loans (000 omitted)	$7,345,000	$7,327,000	$4,555,000
Federal Reserve ratio, per cent	75.1	74.5	70.2
†Railroad earnings	$26,851,397	$34,024,691	$35,220,889
Stock sales, New York exchange	42,923,190	29,429,387	16,693,492
Bond sales, par value	$283,270,600	$233,990,900	$316,504,600

*Leading member banks Federal Reserve System.
†July, June and July, respectively.

Foreign Trade

	Aug., 1935	July, 1935	Aug., 1934
Exports	$172,204,000	$173,371,000	$171,965,000
Imports	$170,139,000	$177,698,000	$119,515,000
Gold exports		$59,000	$14,556,000
Gold imports	$46,084,999	$16,287,000	$51,781,000

Commodity Prices

	August, 1935	July, 1935	August, 1934	Aver. 1913
STEEL's composite average of 14 iron and steel prices	$32.68	$32.44	$32.24	$26.32
Bradstreet's index	$10.00	$9.91	$9.47	100
Wheat, cash (bushel)	98c	$1.03	$1.17	92c
Corn, cash (bushel)	97c	$1.02	90c	51c
Petroleum, crude (bbl.)			94c	$2.50

"Octagonal" Tanks for Large Transformers

BY WILLIAM J. HART

Mechanical Engineer, Sharon, Pa., Works, Westinghouse Electric & Mfg. Co.

EXTENT to which transformers have grown in size in the past 40 years can best be realized by comparing their complete weight of a few hundred pounds. at that time, with their present weight, in the neighborhood of 200 tons. The case which contained the transformer in its early days was a comparatively simple device—principally a light gage corrugated sheet wall embedded in a cast iron base and top flange. As time went on, larger and higher capacity units required more substantial cases, until at the present time formed boiler iron tanks are employed which reach a height of 25 feet and have a rectangular base as large as 12 by 16 feet with a wall thickness in the neighborhood of ⅝-inch.

It will be seen readily that a tank of this size offers many problems not encountered before with the smaller capacity units. Such problems may be described briefly as follows: First, the limitations of dimensions and of centers of gravity set by railroad shipping clearances, as well as the limitations of shipping weight; second, the design of such a structure to withstand a normal internal static oil and gas pressure, with a reasonable factor of safety for abnormal pressures due to short circuits and other system faults; third, the fabrication of walls, bottoms, flanges, girth seams and the necessary welding and testing.

The fundamental shape for shell-type transformers is square for single-phase units and rectangular for three-phase units. The conventional shapes which have been used in the past have been round for single-phase units and oval for three-phase units.

Fig. 1 shows graphically single and three-phase units enclosed in a new type of tank, octagonal in shape, which will be described in this article. It is obvious that the conventional types of tank employed in the past would handicap seriously the development of any larger capacity units due to the limitations of shipment. Little can be done to increase the width of tank shipped by rail; therefore it is necessary to design units to the maximum width that can be shipped and then control the height by sectionalizing the tank and removing all external appurtenances such as base, radiators, bushings and the like for shipment.

A general study of this subject

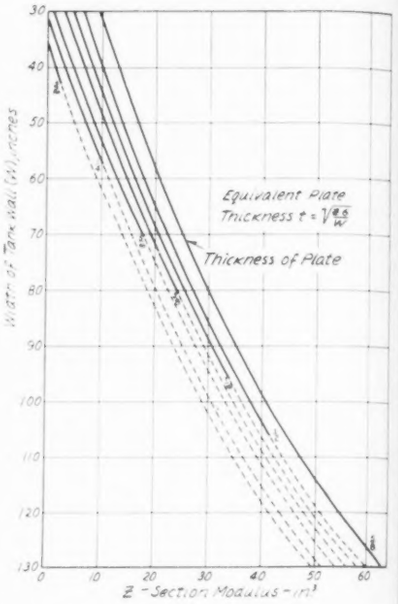


Fig. 2—Characteristic curves representing width of tank and estimated section moduli for different thicknesses of wall

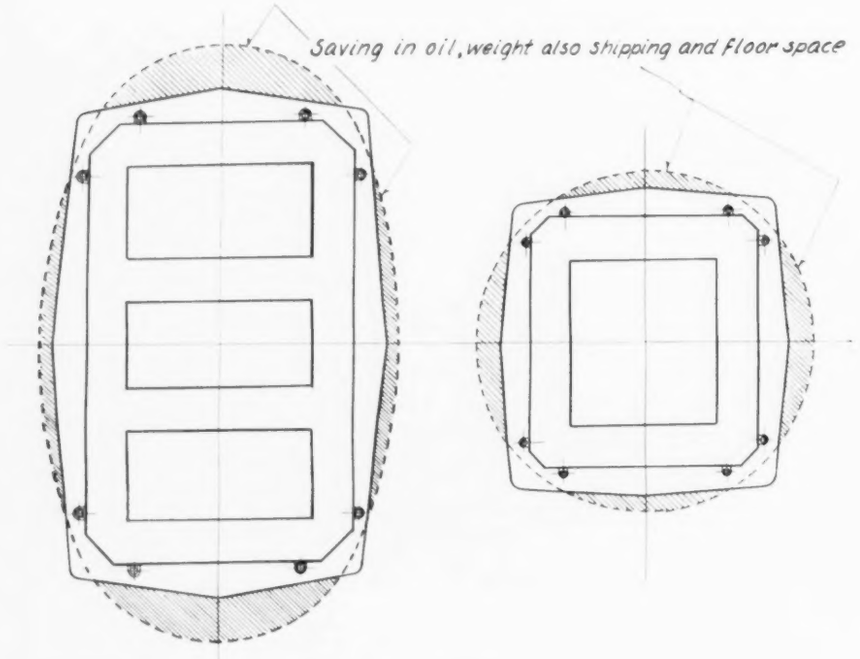


Fig. 1—Three-phase transformer shown (left) in the conventional oval and octagonal tanks. At right is shown single-phase transformer in the conventional round and octagonal tanks

of tanks of suitable design to house a shell-type transformer will reveal that a square or rectangular tank would be the most economical. It would represent a minimum of floor space and could be made to fit close to the transformer core, requiring only mechanical clearance for inserting the unit in the tank. This square or rectangular tank, however, would require unusually thick walls or substantial structural bracing on the outside in order to meet the operating conditions encountered. Internal pressures are developed in normal transformer operation by the expansion of the cold oil from the heat resulting from the copper and iron losses.

This internal pressure acting on the tank wall never exceeds about 5 pounds per square inch, plus an average static oil head which might amount to another 5 pounds. This pressure, however, is sufficient to cause an outward displacement of the tank walls and, without bracing, would in a large unit cause a deflection of 3 or 4 inches. This deflection cannot be permitted for several reasons. The apparatus mounted on

Meet Shipping and Service Requirements

the walls would be forced out of alignment and critical stresses would be encountered in the various welds

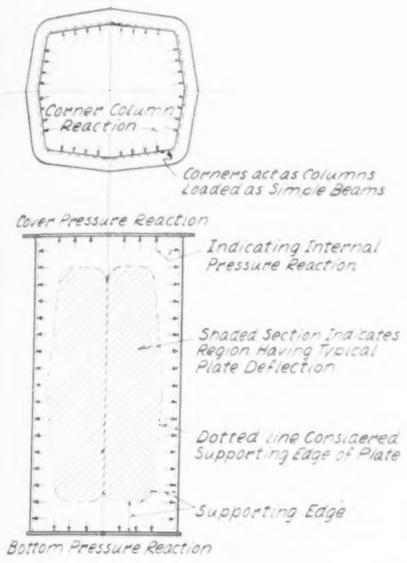

Corner Column Reaction
Corners act as Columns Loaded as Simple Beams
Cover Pressure Reaction
Indicating Internal Pressure Reaction
Shaded Section Indicates Region Having Typical Plate Deflection
Dotted Line Considered Supporting Edge of Plate
Supporting Edge
Bottom Pressure Reaction

Fig. 3—Stress diagram showing study of reactions of tank elements to internal pressure

used in the fabrication of the tank.

Extensive research on the subject of tanks has disclosed the fact that the so-called octagonal tank, shown in Fig. 1, has advantages over conventional tanks in that its shape permits the use of relatively thin walls with a minimum of distortion.

The tank has been called octagonal on account of the eight flat sides, although they do not form any true octagon, the included angle of the flat side being 166 degrees and the included angle in the corners being 104 degrees. These tanks usually are made from four plates although in some cases two plates have been used. The plates are bent to fit a template and are then placed in position and the seams welded. The bottom of the tank consists of a flat steel plate, the outside perimeter conforming to the shape of the tank with sufficient extension beyond the walls for welding. The top, however, consists of an octagonal frame either out of the same plate from which the bottom was made or fabricated from flat bar steel and welded together. No braces are used on the walls whatever as the strength of the walls is derived from the shape of the tank itself.

It is readily understood that by bending a thin flat plate to an angular shape that the moment of inertia is increased greatly and increased in proportion to the reduction of its included angle. It is this characteristic that permits the use of light plates with equivalent heavy plate deflection. Fig. 2 shows curves representing width of tank and estimated section moduli for different thicknesses of wall. These curves are the result of calculations made with plain angular sections. Tests of various sizes of tanks indicate that actual results are satisfactory, considering the effects of cold rolling and plate gage variations, when designs are based upon these curves and the margin taken in their application.

So-called panel ratios of wall width to height have been held within 2 to 1, that is, the height of tank does not exceed twice the width. When the ratio is less, a slight reduction may be made in plate thickness. An explanation of this can be seen in the formulas given later.

The subject of tanks does not lend itself to exact mathematical study. However, certain recognized factors are elementary. A study of the complete octagonal structure composed of the four walls and flat top and bottom, Fig. 3, will reveal the fact that with internal pressure, the top and bottom act as a rigid diaphragm placing the side walls of the tank under tension. This tensile component in the walls partially tends to prevent its collapse due to internal pressure and the four corners, with included angles of 104 degrees, offer rigid columns to prevent the walls from collapsing in the other direction. This general support at the edge of each wall places the wall proper in the condition of a flat plate with supported edges. This analogy is borne out in the testing of tanks of this design and it can be checked by using the conventional elastic formulas. It will be found, however, that the panel ratio influences the behavior of the walls in general. By that is meant that high narrow tanks that exceed the 2 to 1 panel ratio have less pressure reaction on each end and a weaker corner angle support therefore influencing to a marked extent the supporting edge condition of the plate.

Due to the complexity and amount of work involved in calculating the different panel ratios encountered in the range of octagonal tanks, a general formula was devised whereby the principal characteristics can be determined easily. Two principal factors of general importance are: First, the amount of wall de-

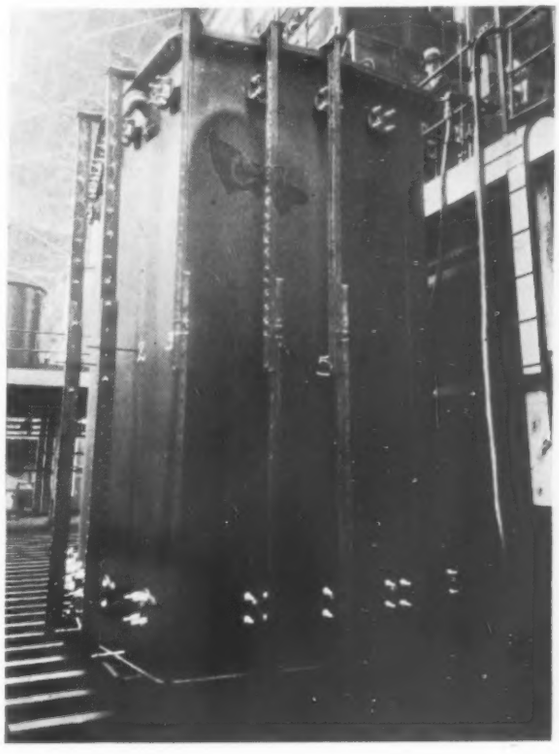


Fig. 4—Typical test setup for commercial octagonal tank, showing measuring pins mounted on vertical structural channels to measure deflections resulting from internal pressure

flection and, second, the fiber stress estimated to be present in the material. In order to calculate the deflection of the walls, a formula used for plain plate deflection and taken from *Strength of Materials*, by S. Timoshenko, Part II, p. 507, was modified as follows:

$$D = \alpha \frac{PW^4}{Et^3}$$

Where

D = deflection of wall in inches.
α = constant taken from Table 1 and multiplied by seven (determined by test).
E = modulus of elasticity (30 x 10^6) for steel plates.
t = equivalent thickness of plate in inches taken from curve, Fig. 2.
P = unit pressure acting against wall in pounds per square inch.
W = width of tank wall in inches.

In order to calculate the fiber stress in the walls, a formula was taken from Grashof's work *Machinery's Hand Book*, p. 401, sixth edition, 1927:

$$S = 0.375 \frac{PW^2H^2}{t^2(W^2+H^2)}$$

This formula utilizes the same symbols expressed above with the exception of

S = fiber stress in pounds per square inch.
H = height of tank wall in inches.

An interesting fact associated with the fabrication of the octagonal tank is that the falls are formed entirely on a commercial bending brake and they do not require as much handling as a round or oval tank would. The plates are formed to their proper angle and then set down upon the tank bottom and welded. Every care is taken to insure proper alignment of walls, bottom and scarfed joints for welding in order that a satisfactory oil-tight weld may be consummated. Wherever possible, welded joints are double welded in order that they may be tested for oil tightness between the welds with nitrogen under a pressure of 300 pounds per square inch. This high pressure readily shows up any minute leak without subjecting the entire structure to abnormal stresses. Covered welding wire is used throughout in order to take advantage of the increased ductility and strength associated with this type of weld.

Table I

Constants for Uniformly Loaded Rectangular Plates with Simply Supported Edges

Ratio of wall height to wall width, H/W	Constant, α
1.0	0.0443
1.1	0.0530
1.2	0.0616
1.3	0.0697
1.4	0.0770
1.5	0.0843
1.6	0.0906
1.7	0.0964
1.8	0.1017
1.9	0.1064
2.0	0.1106
3.0	0.1336
4.0	0.1400
5.0	0.1416
Infinity	0.1422

The method of testing octagonal tanks to confirm the theoretical work that had been done on them is of some interest and an inspection of Fig. 4 shows a typical test set-up for a commercial octagonal tank. In this arrangement bushing flanges located on the cover and radiator flanges on the walls have been plugged with blind flanges. Measuring pins are mounted upon vertical structural channels to measure deflections of the tank walls. These pins are marked when the tank is free of internal pressure and of oil in order to determine at what point the deflection started. As the tank is filled with oil the walls deflect slightly, forcing the pins in a horizontal direction and giving visible indication of the amount of movement recorded. After the tank has been filled with oil, pressure is applied with an air line in 2-pound increments with the deflection recorded and the pressure released before another reading is taken. This process is repeated after each additional increment in order to determine at which point the vessel might take a permanent set.

Conditions Change Under Vacuum

Occasionally this type of tank is used in a service which results in a partial internal vacuum. In order to test for such service, reverse readings may be taken with the same gages. The performance of the tank under vacuum conditions depends considerably upon the panel ratio. When a partial vacuum is applied to a tank, the conditions are changed because the forces between the fixed top and bottom and the tank walls now work in the opposite direction and tend to collapse the walls. The walls have about the same strength for external pressures as they have for internal pressure. The difference in strength therefore is realized to be a change in static conditions of the plate reaction.

Octagonal tanks of the kind described are now being used generally for large power transformers, notably the large 65,000 kilovolt-ampere auto-transformers which will be used at the receiving end of the Boulder dam transmission line. Tests of the kind discussed in this article have demonstrated that they have the requisite inherent strength to withstand the stresses of shipment and of service and the economics of floor space and of weight help to solve the ever-present problem presented by shipping limitations. A complete transformer housed in one of these octangonal tanks is illustrated in Fig. 5.

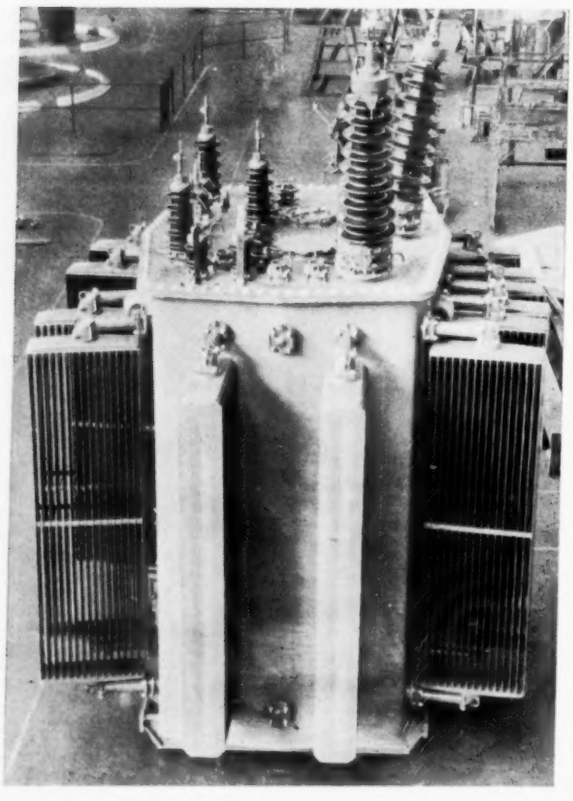


Fig. 5—Complete 65,000 kilovolt - ampere transformer, mounted in octagonal tank

POWER DRIVES

Why Power Drives?

FOR centuries man has sought to generate and harness power and to transmit it to useful work with minimum loss. We go back to the building of the pyramids, both in Egypt and in Mexico and the engineers of today still are striving to determine how these vast masses of stone were formed and placed in position without our modern ideas of power transmission in the handling of materials.

We have been taught that when King Solomon's temple was built the power of thousands of men was employed, but the question arises: With modern machinery and transmission of power, how many men and how many hours would have been required to build this edifice?

What History Reveals

Study of our ancient history reveals that the first mechanical power was employed about 3000 B. C. when the bow drill was employed for creating fire and for work in steel, wood and stone. This may be used as the first date for rope power transmission, and the ropes were made of raw hide, papyrus and flax. The wheel was invented in Southern Asia about 3000 B. C. and from it was developed the pulley about 800 B. C.

It is thought by many that antifriction bearings are modern. Roller bearings were first used by the Grecians about 300 or 400 B. C. The first record of the use of chains is by the Egyptians about 700 B. C. but they were not used for power transmission until about 200 B. C.

Only comparatively recently has the common wheelbarrow been given antifriction bearings and been redesigned tor better balance although for centuries Chinese have used wheels of large diameter and divided the load in front and behind for better balance and easier operation.

From the beginning of the industrial era the drive has not received the attention its importance warrants. This fact was aptly stated about 50 years ago in the following extract from an article entitled "Historical Aspects of Power Transmission", in *Power and Transmission*, Vol. 1, No. 1, December, 1885, published at Mishawaka, Ind.:

"It is a noteworthy fact that economy in the generation of power in the motor (prime mover), and economy in its utilization in the machine have, in most countries, been far in advance of its economical transmission from one to the other."

The field of the transmision engineer lies between the department generating or supplying power and the manufacturing or processing departments which utilize it. He selects and services a wide range of equipment such as motors and their control, electrical distribution systems and associated equipment, belts, chains, gears, speed reducers, variable speed devices, pulleys, shafting, clutches, couplings, bearings, lubricants and numerous other items.

In many plants the essential servicing of such transmission is considered to be a necessary evil. However, where transmission equipment is properly selected for the work it must perform and its operation, inspection, and maintenance are carefully supervised economies in operation and other advantages or benefits to production naturally result. The value of these services depends upon how well they are rendered.

It is for the purpose of assisting its readers in getting greater efficiency from their use of power that STEEL's new department, Power Drives, is launched herewith. It will discuss equipment and its selection for special operating conditions as well as its proper servicing.

• • •

Hacksaw Drives

In altogether too many plants the power hacksaw is one of those neglected machines where "anything goes" on the drive. However, when a machine operator must wait on the hacksaw because it cannot keep up with his production requirements either another, or a more powerful hacksaw, or a better drive is needed. Recently one concern measured its output and found that the saw cut a little over 5 square inches of alloy steel per minute. Another concern, hearing of this performance, made a check and found it was cutting mild steel at about 1 square inch per minute, despite the fact that it was using the best saw blades it could get.

Investigation of the second installation indicated excessive slippage because of an improperly designed drive with no provision for maintaining the proper belt tension between either motor and jackshaft or jackshaft and saw pulley. By redesiging the drive to maintain this tension automatically the output was increased to about 3 square inches of mild steel per minute, an increase of 200 per cent merely because of an improvement in the drive.

Although the hacksaw may not seem to be an important machine tool, nevertheless when a workman is waiting for a piece of metal the saw becomes as important as the idle machine, and as expensive.

• • •

Change to Winter Oil

Speed reducers, chain drives and other equipment using splash or force feed lubrication often require different lubricants for summer and winter, the same as your automobile, when exposed to atmospheric temperature variations. The time of making the change is also a good time to flush out the oil reservoir before adding the new oil. It is well to do this at least once a year, either spring or fall, where the equipment is exposed to very dusty and dirty surroundings, such as on coal, coke, stone, and ore conveyors.

It is not always realized that such drives when installed in pits are usually warmer than those outside in summer, if operated continuously, because of the decreased opportunity for radiation; and that they are colder in winter.

• • •

Abused Flexible Couplings

Although the flexible coupling is widely used on power drives, it is one of the most abused and least appreciated and understood of the mechanical transmission elements. Because the flexible coupling will compensate for a reasonable amount of misalignment some operators seem to think that it will stand any amount.

125 Per Cent Return

Variable speed control is profitable even on machines which are operated only part time. For example, in one plant the variable speed unit paid for itself in about two years from the savings made in machining time, even though the boring mill, which was used for facing the hub and rim on a wheel used in a special seasonal product, was operated less than 40 per cent of the time.

If this work had been continuous, the first year's savings in labor, overhead, and power would have been about 125 per cent of the cost of the variable speed unit installed.

Even though machines and motors are aligned as carefully as possible, may work out of position, foundations may settle, the driven unit may heat and expand in operations, or any of several other things may happen, either singly or in combination, to throw the total misalignment far beyond any reasonable limits which may have been anticipated by the coupling manufacturer. Excessive misalignment results in increased power consumption, wear and, if too great, perhaps failure of the coupling.

Good maintenance practice insists on a check of alignment within a month or two after installation and semi-annual or annual checks thereafter, depending upon the type of service and machine and motor foundation. Even the best coupling, like all other equipment and materials, has limits beyond which it cannot be abused.

• • •

Reliability

Without extensive chemical and physical tests practically the only assurance of the reliability and quality of any fabricated or processed product such as leather, rubber or textile belting is the business standing and trustworthiness of its manufacturer. Often only large purchasers can afford laboratory tests. When judgment is left to appearance even experienced men are often deceived.

Where manufacturers have established a good reputation for the quality of their products and reliability in their dealings the small customer obtains many advantages from depending upon their trade marks or brands and recommendations of their salesmen. He also knows that he will be treated fairly on just complaints.

In addition, some of these salesmen are experts on the use of their products and often are able to make recommendations which solve troublesome drive problems. It pays to seek their advice and give them all of the facts.

• • •

Motor Rating vs. Load

It seems foolish to ask the question: When is a 5-horsepower motor a 15-horsepower motor? Sometimes, however, the answer is in the affirmative. This is a question that the power transmission engineer must answer when laying out any drive, not only because of the motor and protection of electrical circuits and control but also on account of the mechanical elements in the drive.

Every motor drive has as a minimum a mechanical coupling plus the electrical devices. Other mechanical elements such as belts or chains, pulleys or gears, clutches, speed reducers, or any of several other transmission devices, singly or in various combinations, may be used in addition.

In many cases motors start under heavy load, often two or more times the running load. Sometimes momentary peaks or shocks throw excessive overloads on the drives. Motors can be designed to absorb these overloads and dissipate the excess energy by radiating the heat generated.

Mechanical transmission equipment is not designed to do that. Some heat is radiated but in general overloads must be absorbed by providing an extra factor of safety in the material over that needed in connection with a normally rated 5-horsepower motor load.

Thus it is absurd to order a "drive for a 5-horsepower, 1200 or 1800-revolutions per minute motor" without knowing the type of work and load, type of motor, and the service conditions. Many of the difficulties with drives can be traced directly to neglecting to consider the load conditions under which the drive operates. No 5-horsepower drive can operate a 15-horsepower load even intermittently without inviting trouble.

• • •

Code of Application

Selecting speed reducers to meet special drive requirements has been a confusing problm for transmission engineers because of the individual standards for rating adopted by various manufacturers. Thus it has been difficult for engineers to compare different makes and types of reducers.

Horsepower ratings on speed reducers, like those for electrical motors, are only relative; the important factors in both are the load characteristics and reactions under various loads. As a result much reliance has been placed upon the recommendations of salesmen. Contrary to the general opinion, instead of boosting units too large to get a bigger sale, some salesmen overrate their equipment thus offering a smaller unit and so beating competition. (This is also practised with many other types of equipment.) Transmission engineers, therefore, find it difficult to check ratings of equipment offered because of the lack of a uniform rating basis.

After several years' work a technical committee of the American Gear manufacturers' association has reported, and adopted, "Recommended Practices for Rating Helical and Herringbone Speed Reducers and Heavy-Duty Worm Gear Speed Reducers." The effect of this report upon the design and application of this equipment should have far reaching results in industry.

In this report reducers are classified according to types of service; these are indicated by a service factor or class. The buyer, therefore, specifies a speed reducer for the A.G.M.A. rating of the service factor or class wanted and can be reasonably sure of getting what he needs. At least he will be able to compare and check on an established basis all equipment offered.

Industry in general needs more such "codes of application" of equipment.

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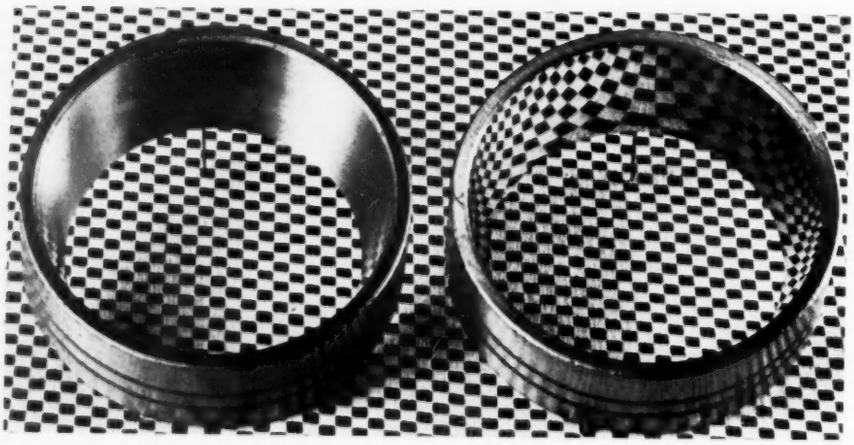
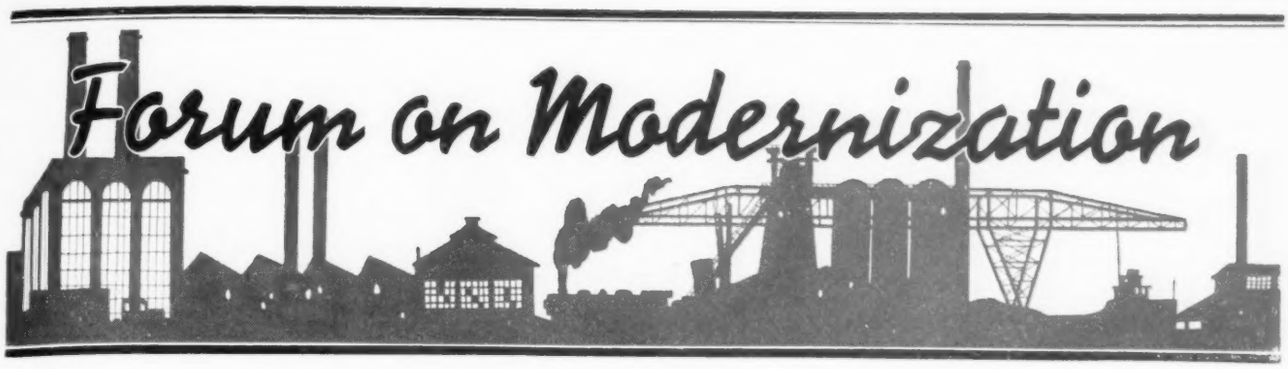
It is not the total cost of the drive that should govern, but the efficiency per dollar expended for the drive.

Mirror Finish for Bearings



THE IMPROVED SURFACE FINISH FOR BEARINGS made by Timken Roller Bearing Co., Canton, O., as described in STEEL *of Sept. 9, Page 35, is illustrated in this photograph. At left is a standard ground cup while at right is a cup with the new Mirror Finish; the latter with entire fidelity reflects the checkered pattern of the background. The new finish is achieved with spcial grits, specially prepared grinding wheels with new and different bonding materials and with special equipment for using these wheels*



Advances in Gears and Speed Reducers Contribute to Efficient Operations

BY F. H. FOWLER
President, Foote Bros. Gear & Machine Co., Chicago

—*Blank & Stoller*

PRACTICALLY every manufacturing, engineering, jobbing and contracting concern is at some time or other a potential buyer of gearing and speed reducing equipment. Generally, the gear or speed reduction unit becomes a part of the entire machine or assembly. Seldom is it possible to find the actual profit accrued from its operation alone.

Although we are unable to point to a piece of our equipment and say, "That unit saved the Blank Co. so many dollars in 1934," we can point to many savings that can be had by replacing obsolete methods of power reduction with modern methods of gear transmissions.

Longer Life, Fewer Repairs

Modern methods and precision machines for the cutting of gears, as well as the development and use of special materials offer the advantages of higher efficiencies, greater durability and strength, which result in longer life and fewer replacements or repairs. By the proper selection of the right type of gearing cut from material best adapted to meet the driving and power conditions, it is often possible to cut power operating costs to an astounding degree.

The purchaser of modern type gearing or speed reduction units in which this type of gearing is incorporated obtains two distinct savings which can be termed profits. They are: (1) Smaller units; and (2) conservation of space.

Where formerly we were accustomed to see a relatively small machine being driven by a large motor and train of open gears or ponderous speed reduction unit, all of which was necessitated by lack of efficiency of the driving elements, we now find that through the development of gearing, incorporating better material and more suitable tooth forms, smaller gears develop greater horsepower. This permits the use of smaller motors, which cost less to buy and less to operate.

New Designs More Compact

Compactness, as well as appearance of the installation or of the product for sale, is one of the problems of every plant manager and engineer. Conservation of space is a necessity in modern day selling. This desire for space saving has also played a large part in the development and design of modern type gearing. The speed reduction unit of today not only costs less to buy and operate, but is a small, compact, efficient smooth running unit requiring a minimum amount of space but producing a maximum amount of power.

For some time the trend among machine design engineers has been toward a combination gear unit and motor mounted integral. An example of this type of gear reduction unit is the helical powered gear and the radiating worm type powered gear. Such construction costs less because the base plate and coupling are not required. Such a compact, complete power and reduction unit can be easily mounted integral with the equipment to be driven. Again we have less original cost, fewer operating parts, less alignment of parts and compactness of design which permits symmetrical arrangement with the driven equipment.

However, while this type of design lends itself to certain applications, there are other applications where it is not at all suitable or profitable, and the standard speed reducer with base and coupling is much more advantageous. It stands to reason that strength and ruggedness of the case, gears and bearings must be sacrificed to obtain compactness of design. While small as well as large individual machines can be equipped with powered gears, extreme care should be taken in the selection of the right size and type of speed reduction unit. A saving in original cost does not always remain a profit over a period of years.

Accepted by Industry

The recently revived brewing industry was quick to realize that old methods of power transmission by large open gearing and belts were too slow, inefficient and costly. Beer had to be produced in the shortest possible time at a minimum cost. Again it was necessary for the gear manufacturer to work with the brewery equipment manufacturer and design the type of drive best suited to meet many of the special requirements. Smaller gear units, smaller motors with less power consumption, higher efficiency and much more compact design arrangement were the result.

Steel mills are replacing open gearing with individual enclosed speed reducer drives on live rolls, conveyors, sintering machines and many other applications.

The large, cumbersome band wheels used for oil well pumping in Oklahoma, Texas and California are rapidly being replaced by heavy-duty speed reducers.

Sewage disposal plants are rapidly replacing the large gears on their sludge tanks which were many feet in diameter with the small speed reduction unit requiring only a fraction of the former space and motor requirements.

Rubber mills, paper mills, grain elevators and practically every other industry have taken similar steps in modernization.

Why? Because it has lowered operating costs and produced greater profits.

Tremendous steps have been taken by the gear industry in the past few

years. Gearing formerly used only as a means of reducing the speed of the prime mover to the designed speed of the driven machine gave little consideration to the space required or the size of the gear necessary to obtain the desired result.

Meeting Individual Needs

Today, another factor—"the customer's problem"—or the most efficient, economical and space saving method of speed reduction is being given more and more consideration by the gear design engineer. High-speed gear cutting machines, capable of cutting high-carbon and special alloy steels, have helped the gear industry to meet the demands of industry for modern speed reducing equipment. In addition to the modern machines and special materials used, a great deal of engineering research has been done on tooth design, case construction and heat radiating capacities, use of antifriction bearings and proper lubrication. Today speed reduction units of 98 per cent efficiency are not uncommon. This means that only 2 per cent of the motor horsepower is lost through the reduction unit.

Regardless of whether your plant is large or small, it is the opinion of most plant engineers that single pulley machines with direct connected motor and reduction unit is the most advisable type of drive. Such machines are more flexible, more readily moved and set up under any existing current conditions, and are certainly more saleable when the time comes to dispose of the machine.

During prosperous times plant operations in many organizations are usually geared up for mass production with batteries of machines set up in series and operated by a single motive power unit. Such organizations usually suffer most during the depression as their operation cannot be adapted readily to reduced production with a proportionate reduction in operating costs. Many organizations have found that old machines can be modernized and profitable productive life prolonged several years by arranging for individual reducer and motor drives. Certainly plant production can be stepped up or reduced as the business demands.

Why is it that some manufacturing companies produce their products at a lower cost than their competitor? We believe the answer is: Better methods of manufacturing by the use of modern equipment and machines selected to do the job at the least cost of power consumption and maintenance.

Plants Provide Opportunities for Safe, Profitable Investments

BY W. W. MILLER
Manager, Industrial Department,
General Electric Co., Schenectady, N. Y.

WHERE to invest capital is a question of increasing importance not only to financiers but also to business executives of practically all industries. Many executives have found and others are finding every day that, even with current volume, one of the most profitable—and safe—places to invest capital is right in their own plant. Scientific discoveries and new developments in materials, methods and machinery are daily making possible such outstanding economies that annual returns of 50 to 100 per cent on investments for new equipment are not unusual.

We have records showing that a leading Southeastern railroad is realizing a 50 per cent annual return on a $25,500 investment in modernization of its repair shop; a mining company in Ohio is earning a 138 per cent annual return on a $3258 investment for improved ventilating equipment; a prominent New England manufacturer improved an annealing process by investing $7000 and is now obtaining a 113 per cent annual return; a Western lumber company invested $16,000 to improve power-steam balance and is earning 112 per cent annually; a Pennsylvania drilling company invested $1020 for improved equipment and realized 188 per cent annual return. Hundreds of other instances could be cited to illustrate equally remarkable returns in all branches of industry.

Where, other than in their own plants, could these investors have found such substantial returns for their money and such a high degree of safety for their investment?

In addition to the direct economies which can evaluated in dollars and cents, practically every investment for the right kind of up-to-date methods and equipment brings many tangible benefits, the importance of which cannot be gaged in terms of direct monetary evaluation. As a rule, operating conditions are greatly improved, reliability and continuity of service are increased, greater flexibility and adaptability to changing conditions are obtained, a stronger competitive position is made possible, and better quality of product and greater consumer acceptance are realized. In many instances, such benefits have proved even more valuable than the direct monetary economies themselves.

Requires Thorough Study

While the field of modernization investments is, broadly, the manufacturing plant, it is necessary to identify the specific method or process or unit of equipment in the plant which can be modernized profitably before a money-making investment can be made. This requires specific information on the latest developments in materials, processes and equipment. It further requires a thorough analysis of plant operation, production costs and existing plant equipment.

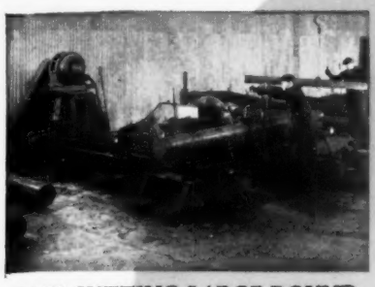
For instance, in the case of individual machines such as machine tools, there are three general reasons for replacing present equipment: In the first place, the machine may have reached a point where, because of old age or excessive use, its maintenance has become excessively high, and it is therefore cheaper to install a new one than to pay the high cost of repairs for the old. Secondly, the unit may be worn to such an extent that it lacks accuracy and its use results in considerable spoilage and a consequent loss in labor and materials sufficient to justify the purchase of a new and accurate machine. Thirdly, the unit may be sound from the standpoint of maintenance and spoilage, but advances in the art may permit its work to be done by a new machine at such a decrease in cost that the expenditure for the latter can be liquidated in a profitable length of time.

A comparison of the existing condition with the latest available possibilities, if made from a sound viewpoint, will usually reveal those specific places where profitable changes can be made. A review of many such studies which have been made in the past reveals that in some cases the change involved only a single machine; in other cases a new process or new materials offered advantages; occasionally a revamping of the entire plant was indicated as the practical investment.

The important point is that the majority of real efforts directed toward finding a better and more

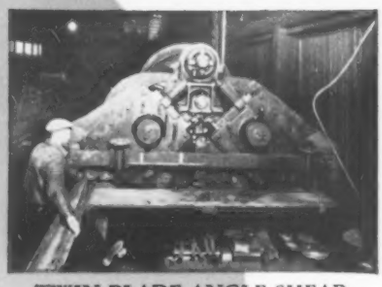
(*Please turn to Page* 36)

FRICTION SAW

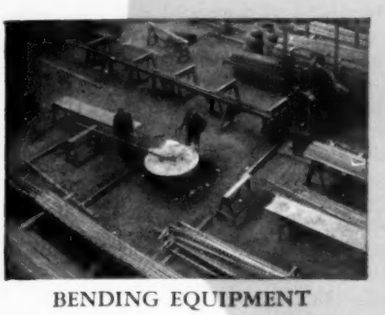


SAW CUTTING LARGE ROUND

STEEL FOR MAINTENANCE WORK IS A *primary part* of J&L WAREHOUSE SERVICE



TWIN BLADE ANGLE SHEAR



BENDING EQUIPMENT

OXYGRAPH CUTTING MACHINE

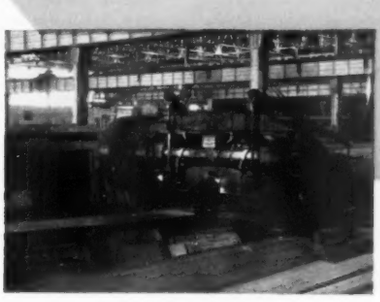


PLATE SHEAR

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Large and complete assortments of steel products are carried in **J&L** Warehouses, and modern cutting, bending, forming and welding equipment enable us to supply them in the sizes and shapes you need and in the forms most suitable for your use. A few of the operations which we are frequently called upon to perform are: forming, machining and milling bars; cutting odd shapes from plates to replace broken castings and forgings; die punching and shearing to accurate dimensions; assembling steel plates and shapes to fit your requirements by riveting, bolting and welding. Whatever your needs for steel, or for the working of it, call on the **J&L** Warehouse nearest you. Highly important, too, is our ability to ship, almost invariably, well under 24 hours. Write for a copy of the **J&L** Warehouse Stock List.

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METHODS AND MATERIALS

Develops High Impact Strength Molding Plastic

Phenolic molding material for larger moldings of the deluxe type, known as 2260 K Black Durez, has been developed by General Plastics Inc., North Tonawanda, N. Y. The new material is claimed to have a higher than average impact strength and is being used on applications where the finest types of moldings are desired. Its impact strength is approximately 33 1/3 per cent greater than the general run of phenolic molding compounds.

The material is finding application for instrument cases, adding machine housings, typewriter parts, boxes and containers, to withstand rough usage, as well as for many decorative parts and products. It has a compressive strength of 29,000 pounds per square inch, a heat resistance of 400 degrees Fahr., and weighs 22.2 grams per cubic inch.

\$ \$ \$

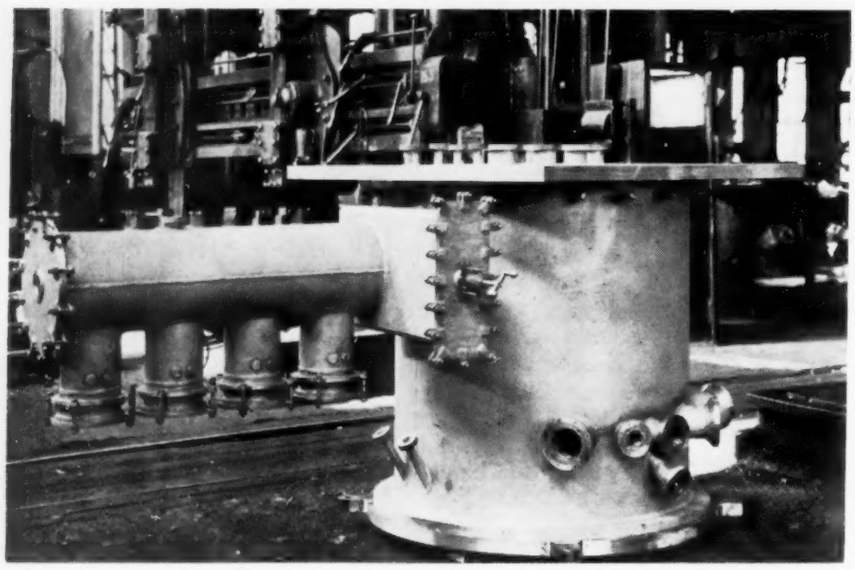
Will Publish Data on Heat Treatment and Properties

The numerous letters of inquiry received by the National Bureau of Standards, Department of Commerce, for practical information regarding the production, heat treatment and properties of iron and steel indicates a genuine interest among men in the plant in the underlying principles of the processes and manipulations with which they come in daily contact, according to H. S. Rawdon, chief of the metallurgical division.

Many of these inquiries about iron and steel indicate a desire to undertake elementary studies of metallurgical processes and materials. The Bureau is attempting to meet the needs of a considerable group of these inquirers by preparing a concise elementary account of the production, heat treatment and properties of iron alloys, steel, cast iron, wrought iron, etc., Mr. Rawdon states.

When completed, the data will be published as a regular Bureau circular. Particular attention is being given in this account to the theories developed within very recent years of hardening of steel and of the role of special alloying elements in steels.

To Lengthen Human Life



MILLION-VOLT X-RAY MACHINE for advanced treatment of cancer at Crocker Institute of Cancer Research, New York, treats six patients at one time. The principal part of the huge machine, a 48-inch diameter tank 46 inches high, shown above, was built by Struthers-Wells Co., Warren, Pa., entirely of stainless steel produced by Allegheny Steel Co., Brackenridge, Pa. The unit was welded throughout using welding rods of the same material. Stainless steel was selected because of the ease with which it may be kept clean in accordance with hospital standards

\$ \$ \$

Molding Practice Causes Blistering of Enamel

Blistering of porcelain enamel on cast iron proved troublesome on a heavy blind end casting. Complicating the problem was the fact that only half of the production of these ends blistered. Inspection showed everything to be as it should be in the enamel plant, with every precaution being taken; therefore, the investigation turned to the foundry.

The molds were made by two men, consequently each man's work was marked carefully and sent to the enamel plant. After the enameling operations were completed, it was observed that one molder's work was good and the other's 100 per cent blistered. The only difference in the way these two men worked was that

the one who produced the defective work cut his sand over, adding water after the sandcutting machine was finished. All difficulty was eliminated when this practice was discontinued.

\$ \$ \$

Unique Device Built for Replacing Anchor Bolts

In installing compressors, a southwestern plant developed an interesting method of installing the anchor bolts so that they may be replaced if the threads become burred or stripped. A steel anchor plate was tapped for the anchor bolt and a conduit brazed to the anchor plate so that the conduit is concentric with the tapped hole in the plate. The conduit acts as a guide that directs the threaded end of the foundation bolt squarely into the threaded anchor plate hole. The conduit is flexible so that if the anchor bolt hole in the compressor frame does not fall exactly on the center of the foundation bolt hole, the conduit nevertheless guides the threaded end into the tapped hole. Anchor bolts thus placed can be removed easily and replaced after the compressor block is set.

\$ \$ \$

Housing for Radio Set Is Zinc Alloy Die Casting

A newly designed automobile radio set developed by the Emerson Radio & Phonograph Corp., 641 Sixth avenue, New York, is built in a zinc alloy die cast housing, making the unit free from rattles and microphonism. The use of the die casting is said to fortify the chassis which is mounted directly on lugs cast integrally with the housing. The company states that the new construction assures perfect tonality.

Direct-Fired Unit Heater Provides Uniform Distribution of Hot Air

NEED for a compact, efficient and rugged unit for spot or localized heating in warehouses, factories, steel plants, industrial buildings, etc., has led to the marketing of direct-fired unit heater. The unit, shown in the accompanying illustration, is built of steel, electrically welded throughout, and is practically indestructible. The lower portion of the combustion chamber is lined with high-grade insulating brick. The sides and top of the combustion chamber are made of corrugated steel with welded fin deflectors on the outer surface. An outer shell of copper-bearing steel completely surrounds the sides and top, leaving an air chamber of the proper proportion.

Flexibility Is Feature

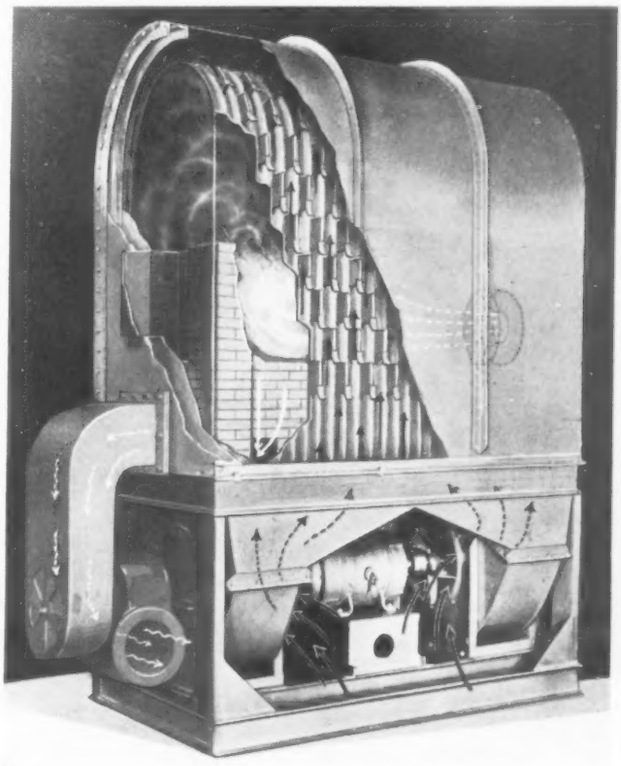
The heater is designed for firing with oil, gas, coal, coke or coke braize, and can be controlled either manually or automatically. Push-button starting and thermostatic control is used with oil or gas burners, or automatic stokers. The unit can be equipped with safety devices, such as a furnace switch in the air discharge to shut off the fuel in the case of overheating the air, a stack switch in the exhaust to shut down in case of flame failure, and a fuel shutoff to function in case of power failure. Overheating of the metal in case of shutdown is prevented by making the refractories of the insulating type, which are light in weight and, consequently, do not store an appreciable quantity of heat.

In the space between the outer casing and the corrugated shell of the combustion chamber is a rapidly and uniformly moving body of air. In the 750,000 B.t.u. size, 10,000 cubic feet a minute from two blowers located in the base of the unit, pass air at 0.8-inch pressure over this heating surface. The air emerges at the base of the unit in three horizontal streams, the one in the center at right angles to the face of the unit, the ones at each end at 45 degrees from the face. This gives a uniform distribution of hot air along the floor.

Discharge May Be Varied

Cold air is taken in from the opposite side and also along the floor. In cases where the hot air discharge at floor level is objectionable, the fans are located on top of the combustion chamber and the hot air flows parallel with the floor about 8 feet above it. With 60-degree Fahr. inlet air temperature, the normal air discharge temperature will be from 130 to 140 degrees Fahr. The combustion chamber being completely surrounded with "black surface," the transmission of heat by radiation is high. Welded fins further increase the heating surface and deflectors direct air from the outer casing toward the inner hot surface and give sufficient turbulence so that the heat transfer by convection is also high.

Gases from the combustion chambers are removed with a small exhauster, which is connected to the same shaft and driven by the same motor as the blowers which handle the air. Thus, while the unit is in operation, the combustion chamber



Black arrows show path of air through fans and over corrugated heating surface. White arrows show gas or oil mixture leaving burner. Flue gases are removed through exhauster at the left

is always under a slight negative pressure.

Space requirement for a 750,000 B.t.u. unit is about 5 feet by 8 feet by 10 feet high. Only a 5-horsepower fan motor is required to deliver 10,000 cubic feet of air per minute at 140 degrees Fahr. The normal waste gas temperatures as a rule do not run over 500 degrees Fahr.

The first direct-fired unit of this type was installed by a steel company about three years ago. After successful tests, an order for 20 more units each of 750,000 B.t.u. per hour capacity, a further order for 10, and finally an order for 64 such units, which comprise the complete heating system for a hot and cold continuous strip mill of the latest type and largest capacity. These units burn heavy oil down to 4-degree Baume with automatic operation and thermostatic control.

The new hot air heater is being distributed by the Dravo-Doyle Co., Pittsburgh.

Special Inspection Insures Accuracy Of Turret Lathe Spindle Bearings

TO MAINTAIN perfect accuracy in the bearings in which the main spindles of its turret lathes are mounted, the Warner & Swasey Co., Cleveland, employs a severe inspection and testing routine to insure that only bearings within the specified close limits go into the main spindle assemblies.

On reaching the plant each bearing first is thoroughly washed and carefully examined by the inspection department for accidental nicks or injuries received in shipment. Following this the assembly is given an unusually rigid inspection as to the taper of the rolls, cup, and cone. This enables the inspectors, experienced in the operation of Warner & Swasey equipment in the field, to decide whether or not the degree of preloading to which the bearings are subjected in the final assembly will insure complete, uniform contact of all rolls over their entire length with the cup and cone when the lathe is put in operation.

Following these tests the bearings again are carefully cleaned and then placed on a sounding board. Here a specially trained inspector spins the bearing with the cup in place. This man has an unusually keen ear and a well developed sense of touch and is able to correlate both sound and vibration, knowing from experience the right combination.

Next the complete bearing is checked for total run-out. To do this the company has developed a device consisting of a heavy steel plate mounted on rubber cushions. On this is mounted a holding fixture in which the bearing is clamped. Coming up through the bottom of the fixture is a sensitive indicator which reads through a microscopic eyepiece to 0.00001-inch.

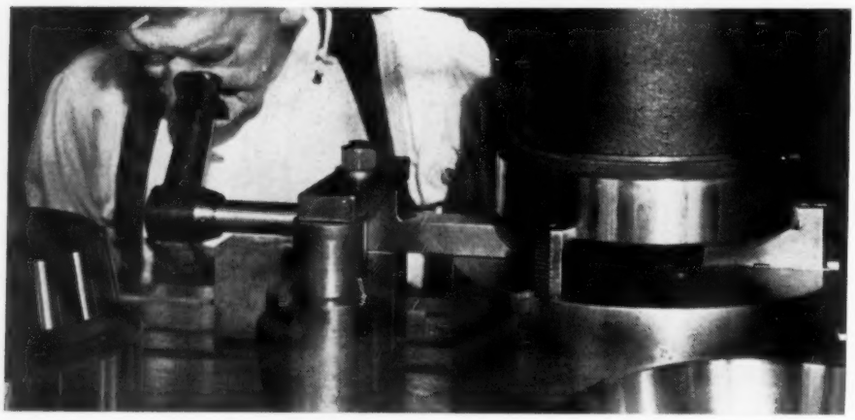
Method Is Described

The cup is placed in the fixture with the large end up, the cone and roller assembly placed in position, and sufficient pressure applied to the upper edge of the cone to make sure that the rollers are forced tightly in position. The bearing and weight are rotated continuously both clockwise and counter-clockwise and numerous readings taken of the runout.

This test indicates the total runout of both the inside and outside of the cone as the rollers pass the indicator inside the cup. If the results are not uniform, the test is extended so that readings are taken as each individual roller passes the line of contact with the indicator during both forward and backward rotations. To meet requirements a bearing may not have more than 0.0005-inch runout. However, it is not uncommon for them to check to within 0.0001-inch.

Although the test for runout is the most important, a final inspection for perfect concentricity of the outside diameter of the cup is made, and at the same time both cup and cone are checked for possible camming action, or back face runout. This inspection is made with the cup placed over the cone and roller assembly and revolved under sufficient load to hold the rolls tightly in place.

Bearings used in these turret lathe main spindle assemblies are manufactured by the Timken Roller Bearing Co., Canton, O.



Special inspection insures that no bearing outside of close tolerances will go into turret lathe main spindle assemblies. This inspection is a part of the painstaking routine employed to enable modern machine tools to maintain their initial accuracy when operating at high speed in production lines

New Steel Unit Conditions Air

SHEET steel is the material used in the manufacture of a new air conditioning unit developed by American Radiator & Standard Sanitary Corp., 40 West Fortieth street, New York. It is an air treatment machine that can be hooked in at any point on the supply line of a radiator heating system and is priced so that it may be installed by a heating contractor for a little more than half the price of the average electric refrigerator.

In its simplest form the conditioner is installed on a basement ceiling with an outlet through the floor above and a register in the floor at a distant point to provide a return of air to the basement. Only a steam or hot water connection together with water supply and drain connection are required. Where construction of a house makes divided distribution desirable only a very simple small duct or ducts are required, as the heat load is entirely eliminated from the air treatment.

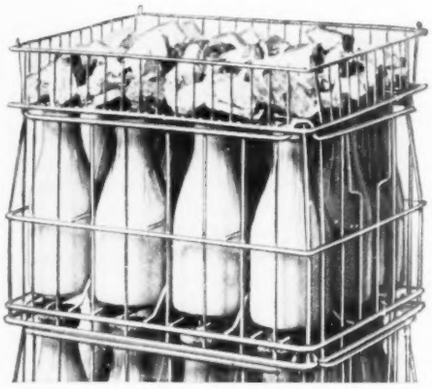
To induce air circulation the unit is provided with a blower driven by a 1/20-horsepower motor, the blower and motor being mounted on a floating cradle that prevents vibration and eliminates noise. Viscous type replaceable filters of fiber board clean the air. A self cleaning nozzle spray provides humidification and washes the air for winter air conditioning.

Through a combination tempering coil and eliminator, cold air is

tempered to prevent drafts when outside air is brought in during the winter and entrained moisture is eliminated. Use of the conditioner with radiator heat is said to make possible evenly controlled distribution of heat and to permit air to circulate through a house in winter at all times while heat is varied according to outside weather conditions. Four different sets of controls are provided, offering varying control. All control arrangements include a solenoid valve.

Icing Basket Formed from Steel Wire and Welded

A close mesh shallow icing basket that will stack with any kind of a milk crate is being marketed by the Union Steel Products Co., Albion, Mich. The basket, as shown in the accompanying illustration, is made of Nos. 5, 8 and 11 gage wire, welded throughout and hot galvanized after fabrication to prevent



Icing basket positioned on top of wire crates provides ample cooling

rusting. Little forming is required except for that required for the frame members. One basket placed every 3 or 4 crates high affords uniform cooling.

Chasers Are Heat Treated In Controlled Atmosphere

Chaso Tool Co. Inc., Royal Oak, Mich., now is manufacturing die heads as well as chasers. It recently placed in operation its plant No. 2 which is equipped with machinery for the manufacture of die head and various types of fixtures for grinding chasers as well as the repair of die heads. The company now is in a position to overhaul or rebuild various types of die heads in addition to furnishing its regular line of chasers. The company announces that it now is using electric furnaces with controlled atmosphere for heat treating its chasers, an operation which adds greatly to the life of the chasers.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

A Good Show

THE National Metal exposition in Chicago this week should be interesting and well attended. Gentlemen who want to know how to weld cast iron without preheating and how to machine the weld without annealing are assured that the process will be demonstrated at the show each day. Automatic welders will do everything a man can do except chew tobacco, and do it twice as fast. New torches, machine driven flame cutters, torch hardening of gears, atomic hydrogen welding heads will be explained and demonstrated.

The technical information available at concurrent meetings of the American Welding society will be taught in colleges about 1945. Manufacturers, production men and engineers who cannot wait that long are advised to attend the show. As a timesaver, no activity of the welding industry compares with what can be accomplished at the exhibition. The industry spends about a quarter of a million dollars to place all its apparatus, methods and supplies as well as its engineers and research men at the disposal of the manufacturing public.

This show will represent private industry at its best. The men and firms who bring their equipment, supplies and manufacturing experts do so because they believe they have something that will interest prospective customers. They expect to make sales because it will be profitable for their customers to buy.

If you like to do business with business men and talk to technical experts who know their business, go to this show. The men you will see there can talk your language.

No Professors on This Job

The commonest problem in welded steel machinery is that of making a base for several mechanically coupled machines. If the base is to be grouted in, the job is merely one of building a structure which will hold the machinery mounted on it in alignment until it is permanently set on the foundations.

Agonizing over the question of how stiff the base should be made is ridiculous. If anyone ever made a base which was just stiff enough to meet all requirements, it would look so flimsy the shipping clerk would never let it get out the back door. So what we do is to make the base heavy enough to look about right, round out all the corners and let it go at that. Steel is the least expensive thing we have to deal with in such construction and it is foolish to spend $100 worth of engineering trying to save $5 worth of steel.

Sparks and Flashes

Several years ago a Norwegian who had learned his welding in this country bought some fine welding equipment and returned to his homeland to show them a few things. Within two years he was back. His answer to questions was simple and conclusive: "Those squareheads knew more about welding than I did."

* * *

A steel rod 1 inch long, free to move, will contract approximately 0.0000067-inch if its temperature is lowered 1 degree Fahr. A stress of a pound per square inch will produce a strain of approximately 0.000000033-inch. From these facts, it may be reasoned that if the rod 1 inch long were cooled 1 degree and were not free to move, the stress set up would be about 223 pounds per square inch. This is the source of residual stresses in welded assemblies which, however, are impossible to calculate in a given instance and difficult to measure.

Better Tools and Gages Are Available at Lower Cost

CONTRIBUTING its part to the National Machine Tool congress held in Cleveland, Sept. 11-20, the American Society of Tool Engineers sponsored a dinner-meeting at Hotel Statler on Friday evening, Sept. 13. A large delegation of the society, whose headquarters are in Detroit, had traveled from Detroit to Cleveland by chartered boat to spend that day at the Machine Tool exposition. The day's program was concluded with the dinner-meeting attended by over 500, after which the delegation returned to Detroit.

R. M. Lippard, Detroit manager, Heald Machine Co., and president of the American Society of Tool Engineers, presided at the dinner and the meeting. After an expression of greeting, he introduced C. R. Burt, president, Pratt & Whitney Co., Hartford, Conn., and chairman of the Machine Tool Congress. Mr. Burt welcomed the society to Cleveland and thanked it for its participation in the congress program.

President Lippard presented a certificate of honorary membership to John Younger, professor of industrial engineering, Ohio State university, Columbus, O., who has taken a keen interest in the society and rendered valuable assistance.

William H. Smila, master mechanic, Jefferson plant, Chrysler Corp., Detroit, spoke at length on the work which the society is undertaking in preparing standard data sheets of machine tools and small tools. After a considerable period of preliminary organization, the society is issuing the first data sheets which are designed to meet the requirements of tool engineers, tool specifiers and tool designers when specifying and tooling machines for production. Thus far, equipment manufacturers have appeared eager to cooperate in the preparation of the data sheets.

Development of Cutting Tools

The principal paper of the evening was presented by A. H. d'Arcambal, consulting metallurgist, Pratt & Whitney Co., Hartford, Conn., on the subject, "Latest Developments in the Metal Cutting Tool and Gage Field." Machine tools can not deliver maximum production and quality unless properly equipped with the best cutting tools and gages, said the speaker.

Cutting tools are required to machine parts made from a wide variety of materials and closer tolerances in production require greater accuracy in the tools. Today, better quality tools are available at lower prices.

Mr. d'Arcambal pointed out that the bulk of cutting tools are made from high speed steels and the large majority are made from steels similar in composition to those used 25 years ago, except that carbon and vanadium contents are slightly higher. There is increasing demand for cobalt high speed steels having either 4 or 8 per cent cobalt—tools made from these steels have marked red hardness properties and are employed advantageously for turning steels, particularly heat treated alloy steels.

Much interest has been displayed recently in high speed steel containing 0.80 per cent carbon, 4.00 carbon, 2.10 vanadium, 19.00 tungsten and 0.60 molybdenum. Turning tools, cutters, reamers and broaches made from it show longer life between grinds for certain applications than the usual 18-4-1 steel. The speaker doubted, however, if this steel finds the same general use.

Another new type of steel is the molybdenum-tungsten material containing 0.75 per cent carbon, 4.00 chromium, 1.00 vanadium, 2.00 tungsten and 8.00 molybdenum. Tools made from it are hardened at considerably lower hardening temperatures, which results in increased tool toughness.

Cemented tungsten carbide was introduced just prior to the last machine tool show in 1929, but unfortunately this material was not marketed properly in the early stages of its development. Tungsten carbide performed splendidly on certain material and poorly on others, for example, it worked well with nonmetallics, nonferrous metals and cast iron, but failed on steel. Since first introduced, the material has been improved and new grades developed—today its limitations and applications are well understood.

Later, cemented tantalum carbide was introduced for steel turning, but this material has not proved to be entirely satisfactory and further development is necessary. The newest development, said Mr. d'Arcambal, is cemented titanium carbide. It is being employed satisfactorily on some

Interested crowds swarmed through the large exhibit of Cincinnati Milling Machine Co. and Cincinnati Grinders Inc., Cincinnati, at the recent Machine Tool Show In Cleveland

ONE of the most extensive and striking exhibits at the Machine Tool Show was that devised jointly by Pratt & Whitney Co. and Warner & Swasey Co. Central figure in the exhibit was a model of the McDonald observatory, in the building of which both companies co-operated

steel jobs, principally high speed, light cut boring operations.

Machine tool builders have designed their machines to provide the high speeds which are necessary to employ cemented carbide economically. Good performance records are being shown by stellite and J-metal for nonmetallics, nonferrous metals, cast iron and some types of steel. In spite of all the newer tool materials, however, the demand for high speed steel is destined to increase with time, in the opinion of Mr. d'Arcambal.

Improvements in Toolmaking

Tool manufacturing plants in recent years have installed the latest type of hardening room equipment. The fuel-fired and electric furnaces are equipped with automatic temperature controls and electric timers. Considerable use also is being made of controlled atmospheres in furnaces to prevent decarburization and scaling.

The company with which Mr. d'Arcambal is associated has experimented wtih nitrided high speed cutting tools for over ten years and has reached the conclusion that there is a very limited field for nitrided taps, reamers, cutters, hobs, and similar tools. For certain applications, however, nitrided tools have shown greater service life.

Application of chromium plating to tools and gages probably will increase with greater knowledge of the plating process. At the outset, gages were plated to provide resistance against wear, later manufacturers undertook to apply plating to certain cutting tools. Plated reamers show greater life than unplated reamers under certain conditions. On the other hand, experience with plated taps or threaded tools is not so satisfactory.

Gaging practice is constantly assuming more importance because of closer manufacturing tolerances and more extensive interchangeability. Electric gages are finding wider use both in inspection and production. The speaker reported that chromium plated gages give five to ten times the service of unplated gages. Standardization of gages has been of very great benefit to industry.

Sees No Radical Design Changes in Machine Tools of Next Five Years

TOMORROW'S machine tools—at least those of the next five years—are with us today. Such is the belief of Guy Hubbard, machine tool consultant, as expressed in a discussion presented Sept. 17 at the Machine Tool congress in Cleveland.

Mr. Hubbard pointed out that we now are stepping over an imaginary line between a period of depression during which there has been intense technical stimulation, into a period which we expect will be one of intensive production. During this time, engineering brains will be switched for a considerable period from the problems of inventing machine tools, to the problems of refining and manufacturing these improved machines to meet the needs of a rising tide of users. This means prospective purchasers can buy machine tools with reasonable assurance they will not be outmoded next year or even within their fair economic life.

New machine tools have such a reserve of power, speed and rigidity that the cutting tools of tomorrow—even though they be as hard as diamonds and of toughness now unknown—can be made to perform capably in them. In other words these machines may be retooled to meet conditions of cutting tools and products far beyond anything with which we now have to contend.

Further progress in machine tool design and manufacturing technique will not be halted during the next five years, but rather will be concentrated on tool attachments and accessories more than on the basic machines themselves. There will be excellent opportunities for engineers in the realms of production engineering, service and sales. The machine tools of tomorrow are not going to sell themselves, and they certainly are going to be the most difficult machines to build in quantity of any machinery in industrial history.

Manufacturing Methods Changing

Though tomorrow's machine tools are here today, Mr. Hubbard is not at all sure that the tool plant of tomorrow is with us yet. Machine tools will in the future be produced in shops where equipment and shop practice is wholly different than it has been in the past decade. The finest of equipment which machine tool builders now are offering to other industries will have to be applied to the machine tool industry itself. Gaging and measuring systems which formerly were confined to the

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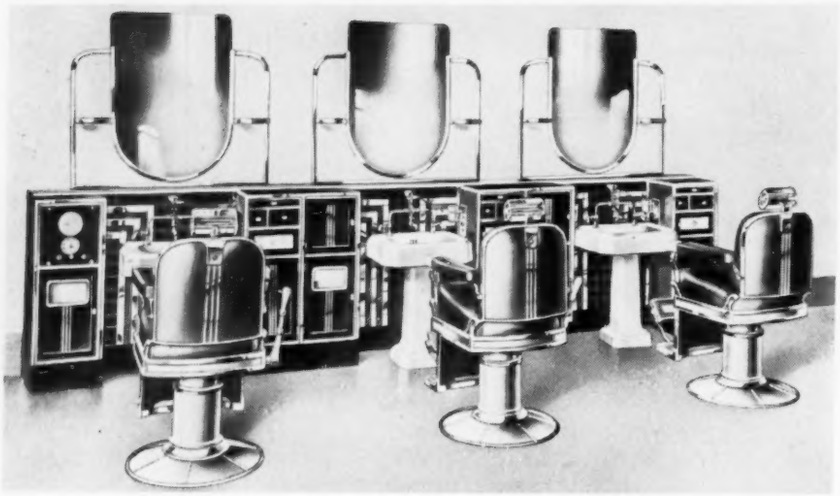


—Courtesy Theo. A. Kochs Co., Chicago

Modern barber shop furnishings, glistening in porcelain enameled and chromium plated steel, are far removed from the carved wood and red plush affairs of grandfather's days, and represent an important outlet for steel and iron products

LARGE USES OF STEEL IN SMALL WAYS

296th Article ◆ Barber Shop Equipment

WHISKERS largely have disappeared as a facial adornment of the male of this country and hair styles also have changed decidedly during the past half century, yet tonsorial practice has been altered to no greater extent than has the equipment with which the barber plies his trade.

Prior to about 60 years ago, the furnishing of barber shop fixtures and supplies was carried on by a variety of interests; soaps and cosmetics came from the druggist, shears and razors from the cutler, chairs and other furniture from the cabinetmaker. Shortly after the great Chicago fire of 1871, Theodore A. Kochs, who had conducted a drug store in that city, conceived the idea of extending his operations to include the sale of all barber's supplies, and a new business was launched.

In those days the most popular barber chairs were made of wood. They were handsomely carved and were covered with plush, the emphasis seemingly being on ornate appearance —typical of the times. Cast iron chairs also were manufactured, but these were of the cheaper type and less ornate. Wall fixtures and wash stands were made principally of wood, frequently being highly decorated to match elaborate surroundings.

Times change, however, and iron and steel steadily replaced wood in the manufacture of barber shop equipment. The modern shop almost might be termed an all-metal creation, as evidenced by the accompanying illustration of the latest design of chairs and fixtures. Mirror frames are chromium-plated steel tubing. Wainscots are made of colored porcelain-enameled and chromium-plated steel tile. Cabinets are ornamentad with steel strips. In addition, liberal use is made of tubing and other rolled steel products in the fabrication of waiting chairs, manicure tables, cashier stands and hat and coat racks and other adjuncts.

Modern barber chairs are made principally of iron and steel, and what they have lost in grandeur since the days when a wood carver was necessary for their manufacture, they have gained in utility and comfort. The mechanism of the barber chair has changed but little during recent years. The hydraulic lift was introduced in 1897, replacing the earlier ratchet lift. Porcelain enamel on chairs made its debut in 1911.

About 90 per cent of the approximately 400-pound weight of a barber chair is cast iron. The upright drum and housing of the base of the chairs illustrated are cast iron, but the base is covered with porcelain enameled steel sheets, with steel bars radiating from the center. Rolled steel also is employed for parts of the seat rail, back, footrest and headrest. It is estimated that before the depression the manufacture of barber chairs involved the consumption of more than 3000 tons of iron and steel annually.

Use of rolled steel is growing rapidly not only for barber shop equipment but also for chairs and other facilities for beauty shops. Manufacture of beauty shop furniture has become an important branch of this industry, and in view of the liberal use of steel in the design of chairs, etc., has developed into a substantial market for tubular and flat-rolled steel products. This trend toward general use of steel has been a development of only the past few years, but has met with such widespread approval as to indicate that beauty shop equipment will contribute materially to the future growth of steel consumption in the manufacture of many different types of furniture.

Forum on Modernization

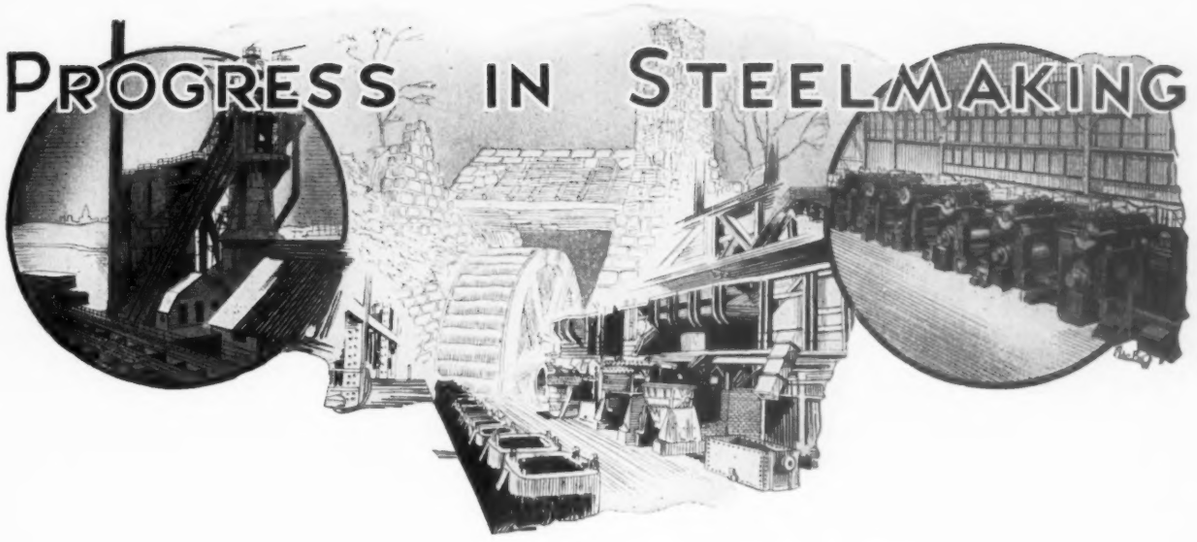
(*Concluded from Page* 28)

economical way of doing things has revealed some means by which profitable changes could be made. The cost of making such a search is usually negligible compared to the benefits obtained. Many employers urge their employes to seek and suggest changes which might lead to increased economy.

Our viewpoint at General Electric is that any attempt to avoid capital investments by operating obsolete equipment frequently wastes more capital than is needed to purchase modern, improved equipment. Obsolete equipment adds to losses indefinitely; whereas the right kind of modernization pays for itself and then adds to earnings year after year. Moreover, since savings start with the first sound change, a great deal of profitable modernization can be accomplished a little at a time and with relatively small outlay. The result is constantly increasing productive efficiency, greater returns on the modernization investment.

Redesigns Bath, Shower and Lavatory Fittings

Empire Brass Mfg. Co., Cleveland, has redesigned its line of bath, shower and lavatory fittings. They now are made in art and round patterns for beauty of appearance. In addition, they all are made with removable parts so that when once installed they can be used a lifetime. Any part that may become worn can be removed and replaced without removing the fixture from the wall.



Prolongs Mold Stool Life

Placing a steel plate, ⅛ to ½-inch thick, on a copper mold stool to receive the impact of the stream of metal when the ladle first is opened, protects the stool from erosion and greatly prolongs its life. Recent tests of four 5½-ton ingot molds involving the teeming of about 84 heats per mold, disclosed the copper stools to be in the same condition physically as when they first were placed in service. The plate employed for this purpose welds to the bottom of the ingot.

• • •

Serves as Bearing Coolant

Application of a lubricating compound on the flywheel shaft of a plate mill shear permitted the bearings to run cool for the first time in 15 years. The bearings formerly were kept cool by pouring water over them.

• • •

Affords Better Ingot Wall

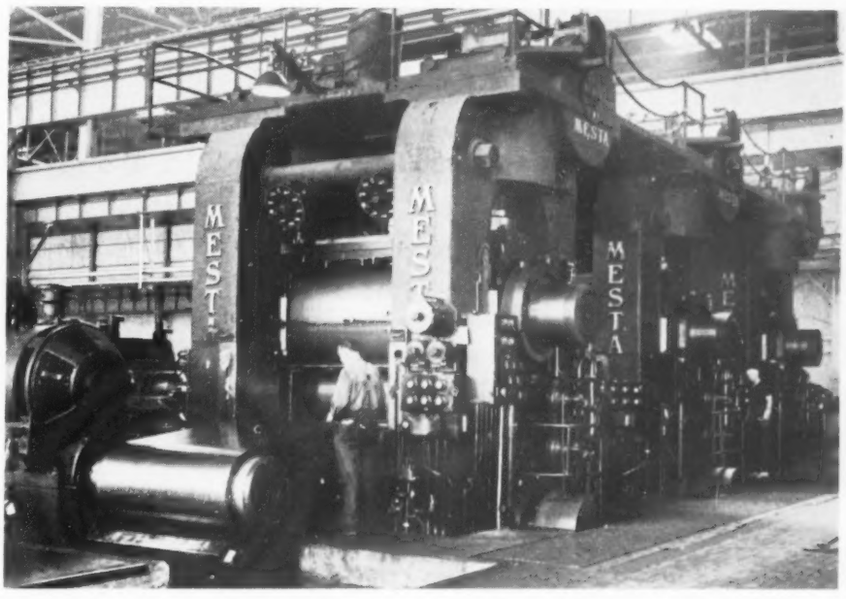
An Ohio open-hearth shop after investigating round ladle nozzles with a 1¾, 2 and 2¼-inch opening and an oval nozzle 1¾ x 2¼ inches has chosen a 1¾-inch nozzle as giving the best teeming practice. Less difficulty with scabs, a better ingot wall and more uniform segregation are afforded inasmuch as the heat pours about 0.01 per cent higher in carbon than when larger diameter nozzles are used.

• • •

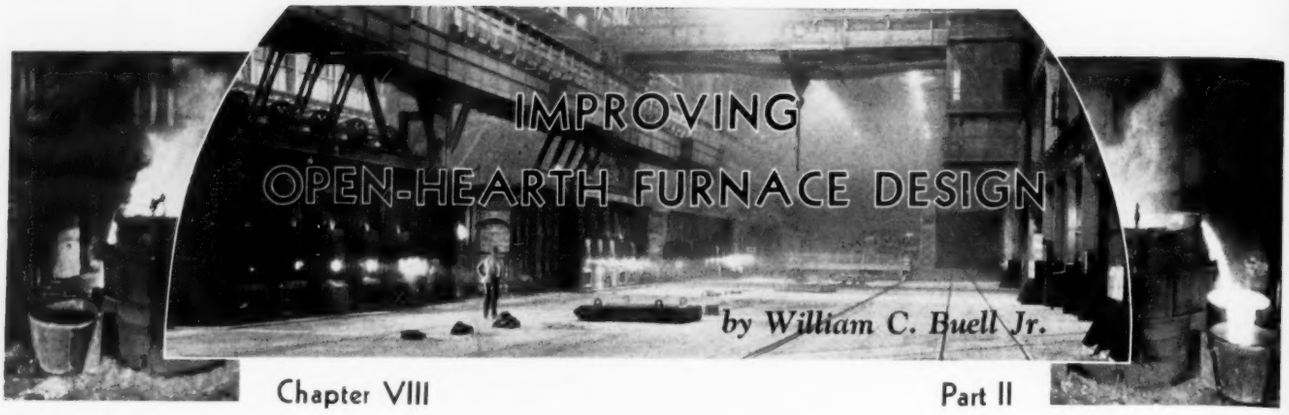
Develops New Rust Remover

To remove rust and grease from steel to be painted, lacquered or varnished, to prepare high-finished sheets for paint and metal surfaces for refinishing and to remove rust from tools, machinery, etc. are a few of the numerous uses of a newly developed liquid cleaner which imparts rust inhibiting properties to the metal treated. The liquid is a balanced mixture of phospheric acid, solvents and other ingredients. The solution has a boiling point of 310 degrees Fahr. so that there is no rapid evaporation; if extremely rapid removal of rust and oxide is desired, the liquid may be heated or applied to the metal while hot without appreciable loss. In some cases the parts, after treatment, are rinsed with hot water, dry tack ragged and finished; in other cases the treated material is wiped off well with clean dry cloths, dried, given a wipe-off with solvent mixture or thinner, and finished in the usual manner.

Plans To Roll Sheets 90 Inches Wide



NEW CONTINUOUS COLD STRIP MILL STARTS OPERATION—A single stand of 93-inch rolls is installed in the new cold roll department of the Youngstown Sheet & Tube Co.'s wide strip mill at Campbell, O., with which the company will pioneer in the rolling of sheets up to a width of 90 inches. The 3-stand, 4-high continuous broad cold mill shown in the accompanying illustration is designed to roll sheets in coil form up to 72 inches wide; it has a capacity ranging from 150 to 200 tons per 8 hours. A typical coil of hot strip as it comes to the cold mill may be ⅛-inch thick and 500 feet long. The cold mill may reduce it to 0.0050-inch and elongate the coil to 1200 feet. Reduction to this thickness as well as the elongation is accomplished by 10 stands of rolls in the hot mill and three stands in the cold mill. The hot and cold mill departments cover more than 12 acres



IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter VIII — Part II

Checkerwork for Open-Hearth Furnaces

FROM the volumes available for the checkerwork Table CVII and the details of the checkerwork as found in the typical furnaces, Tables CXXII and CXXIII the data of Table CXXV to indicate the exposed area of checkerwork is developed. The figures are for one set of regenerators only.

The relatively large unit surface area in the regenerators of furnaces J, N, O, I, L, D and M, column h, are secured at the expense of checker flue area. It is thought that enlarging the checker flue area in all of these regenerators would benefit present operation materially.

In addition to the transfer surface presented in the checkerwork a considerable area also is offered in the walls, bottoms and roofs of the downtakes, slag pockets, fantails, upper and lower regenerator chambers and the connecting flues. The proportion of these surfaces to the checker surface is subject to many variables, but in general may be expected to aggregate about one-sixth of the checker surface or 15 per cent. As a result of observation and supporting data it is considered that at least 30 per cent of the total heat exchange takes place via these plane surfaces. The areas of the several furnace components that are a factor in the heat exchange and calculated from the proposed furnaces are given in Table CXXVI.

The thickness of the checker brick affect all other design factors. Given brick of the same length, thicker brick reduce checker flue area slightly, increase the exposed surface area, increase the weight of the mass of brickwork and increase cost both from the greater mass and on account of the "extra" on special brick shapes.

Because of the much greater length of the reversal cycle, the consistency of the operating rate over long periods, and the contingent relative ease of controlling and measuring all factors of their operation it has been possible to definitely prove the heat transfer efficiency of checker brick of varying thicknesses in the operation of the blast furnace stove. While the operation of the blast furnace stove and the open-hearth regenerator are recognized as so dissimilar that little of the data from either operation

Table CXXV

Exposed Area in Checkerwork as Found in Typical and Proposed Furnaces

(Values Are for One Side Only)

Regenerator	Air Checkers Volume ft.³ CVII a	Air Checkers Ft.² exposed surface b	Gas Checkers Volume ft.³ CVII c	Gas Checkers Ft.² exposed surface d	Combined Checkers Volume ft.³ CVII e	Combined Checkers Ft.² exposed surface f	Ingot prod. tons/hr. XCII g	Ft.² exposed surface per ton ingots/hr. h
GROUP A								
A	4,980	18,330	3320	12,210	8,300	30,630	13.16	2325
J	6,140	32,225	3250	17,060	9,390	49,285	13.41	3675
K	5,950	21,875	4150	15,275	10,100	37,150	13.86	2680
N	6,960	25,600	4900	18,030	11,560	43,630	16.97	2570
O	6,960	25,600	4900	18,030	11,560	43,630	19.15	2280
Proposed	7,200	26,480	4500	14,710	11,700	41,190	13.90	2965
GROUP B								
I	7,260	26,025	4425	15,930	11,685	41,955	17.22	2435
P	7,070	20,500	3535	10,250	10,605	30,750	13.57	2264
GROUP C								
G	5,080	18,550	3635	13,270	8,715	31,820	12.17	2615
L*	6,800	24,480	4375	15,760	11,175	40,240	13.74	2930
GROUP D								
B	3,240	11,920	2395	8,810	5,635	20,730	10.02	2002
D	4,145	14,420	2525	9,090	6,660	24,380	9.24	2640
E	4,450	16,020	3045	10,970	7,495	26,990	11.58	2330
H	4,260	10,560	2980	7,380	7,240	17,940	10.51	1706
F*	4,485	11,120	3075	7,620	7,560	18,740	11.04	1698
M	10,025	36,120	.....	.....	10,025	36,120	13.44	2690
Proposed	6,750	17,700	4500	12,460	11,250	30,160	14.75	2045

*Recalculated for 3 pass operation as illustrated.

Table CXXVI

Surface Areas Other Than Checker Surfaces Which Function as Heat Exchange Media

(Calculated from Proposed Furnace Designs)

All values are square feet	Producer or Mixed Gas Furnace —System— air a	fuel b	total c	Fixed Fuel Furnace —System— air d	gas e	total f
Downtakes	592.0	148.5	740.5	577.0	.....	577.0
Slag Pockets	777.0	588.0	1,365.0	1,066.0	.....	1,066.0
Fantails	434.5	267.8	702.3	411.4	267.8	679.2
Regenerators						
Upper chamber	688.0	456.0	1,144.0	654.0	456.0	1,110.0
Rider flues	1,700.0	930.0	2,630.0	1,670.0	930.0	2,600.0
Connecting flues	285.8	249.5	535.3	273.7	249.5	523.2
Total	4,477.3	2,639.8	7,117.1	4,652.1	1,903.3	6,555.4
Surface in checkers	26,480.0	14,710.0	41,190.0	17,700.0	12,460.0	30,160.0
Total Exchange Area	30,957	17,350	48,307	22,352	14,363	36,715

can find parallel application in the other, the single item of the effect of differing checker thicknesses in the blast furnace stove may be cited in support of the thesis of thinner checker brick in the open-hearth regenerator. In blast furnace stove practice, a stove is "on blast" for periods of two or three hours and "on wind" for one hour. Lately it has been proven definitely that in this practice the thinner brick is more effective and several stoves are operating with but 2-inch thickness of brick between the flues; blocks 1½ inches thick between the flues now are proposed. Designers and operators of this equipment aver that a greater thickness than 2 inches merely loads the stove with refractory that is utterly ineffective to the operation.

Small Portion Effective

Consider then the 10 to 20 minute cycle of reversal in the open-hearth regenerator in the light of the foregoing and it becomes evident that but a small portion of the thickness of even a 2-inch thick checker brick is effective in the heat transfer effects. Granted that there ever will be structural or stability factors that will preclude the use of brick of a thinness that would develop the optimum in the factors sought, it is safe to make the statement that brick thicker than 3 inches never should be used, 2½-inch thickness would be better, and that 2-inch thickness should be given careful consideration and trial.

As a result of a careful research in the subject, F. E. Leahy has developed a series of curves showing the percentage of the surface temperature that the center of checker brick of various thicknesses will reach at intervals appropriate to open-hearth regenerator operation. An adaption of Leahy's values for 2, 3 and 4-inch brick thicknesses is given in Fig. 156. From these curves it may be seen that during the average 15-minute reversal period of open-hearth operation, the center of the 2-inch brick will be at nearly the same temperature as its exposed surfaces, that the center of the 3-inch brick will be at 70 per cent of the temperature of its exposed surfaces and the 4-inch brick at 40 per cent of its exposed surface temperature. The values of the curves, which have been substantiated and paralleled in actual practice, would indicate the 2-inch thick brick as that best for operation from the standpoint of the thermal economy of the regenerator.

Brick of unnecessary thickness are disadvantageous in that checker flue area is abridged, checker costs are increased without a commensurate return from an increased salvage of heat, thicker brick require a much larger period after a shut down to reach their maximum operating temperature and to develop the thermal equilibrium of the system, and unnecessary brick mass requires heat in the development of the thermal equilibrium that never is salvaged.

The successful use of 2½-inch thick checker brick in the regenerators of furnace K, in a large number of noncited furnaces, and of 2½-inch thick tile in the regenerator of furnace P should prove an incentive for the greater general adoption of thinner checker brick.

Shapes Are Diversified

Open-hearth operators have been obliged to give the regenerator system much thought and as a result a large number of checker brick shapes and arrangements have been patented and their use promoted on claims of greater heat exchange through the features of a particular design which may develop greater surface, greater mass, greater turbulence, greater structural rigidity, ease of cleaning, etc.

Among the patented designs which have found some favor are those of A. E. Peterson (U. S. Patent No. 1,687,786), showing an interlocked construction, George L. Danforth (U. S. Patent No. 1,140,125) developing greater surface area, and Fred H. Loftus (U. S. Patent No. 1,752,494) producing greater mass and turbulence. The foregoing are representative of the open or unit-type checker.

In addition some patented designs

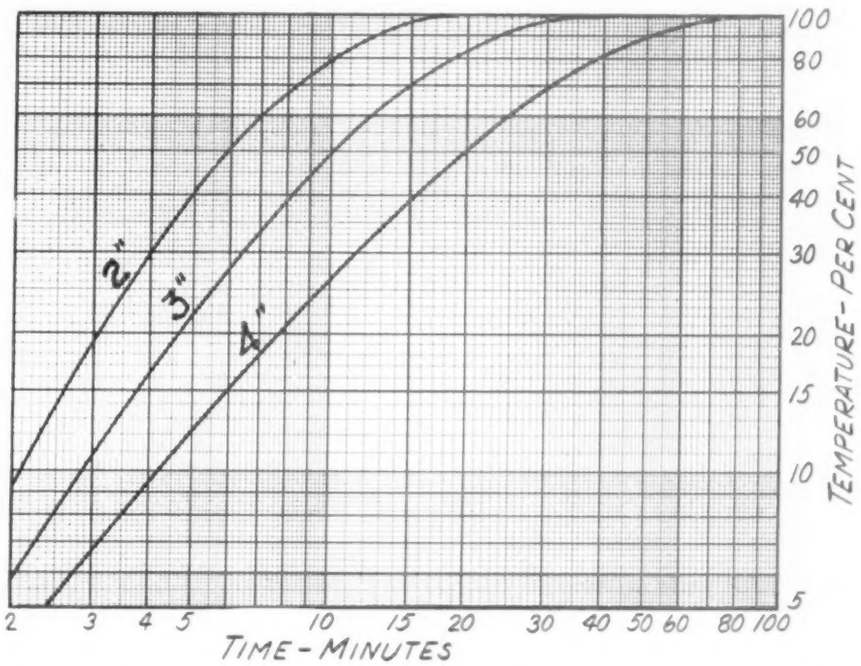


Fig. 156—Percentage of surface temperature at the median line of checker brick of thickness noted at any time. Both faces are heated

of the block-type checker have been tried. This type checker is usually an adaption to the open hearth of a multiple flue arrangement that has been used successfully in blast furnace stoves. The few installations of such designs made in the United States have proved unsatisfactory, see Fig. 154, Case A, and appear to hold no possibilities in American open-hearth practice, excepting with mixed, coke-oven or natural gas firing. Various successful and satisfactory installations of this type of block are claimed in German practice and promoted in the United States on the strength of German success.

However, when it is considered that in Germany the 80 largest open-hearth furnaces, excepting six tilting furnaces, range from only 50 to 100 tons capacity, and many of these are fired with mixed gas, and the economics of their practice are different from ours it again will be patent there is little parallel in the German and American practice.

Checker brick life, or effectiveness, will vary greatly with regenerator design, fuel, metallurgical and operating practice, as well as the shop policy as to checker replacement at a rebuild, and, to some extent with the brand of brick used.

Obviously checker brick should retain their effectiveness longer with the fuel practice that produces the least dust, and in regenerators having the best gas distribution.

During a campaign, be it short or long, some of the brick, mostly in the top layers of the checkerwork will become so badly fouled as a result of dust accumulation or glazed as a result of dust and temperature that their effectiveness as heat transfer media will be wholly lost, and these brick must be replaced at the earliest opportunity. Many plants make it the practice to do this at the end of a campaign and in addition to clean the checkers by means of an air or steam lance and remove such of the dust accumulation from the rider flues as may be done conveniently.

Checkers Are Removed

On the grounds that it is not economic to start a furnace on a new campaign without bringing the entire system into as nearly the condition of a new furnace as possible, a number of operators are now removing all checker brick at the end of every campaign, cleaning the flues 100 per cent and then relaying the checkers, placing the new brick required to replace the brick discarded, *at the bottom* and the older and thoroughly seasoned brick towards the top. In the plants in which this advanced practice is followed laborers rather than masons are used in the removal as well as the relaying of the checker brick. In such practice brick that may be salvaged by cleaning or chipping and other brick showing evidence of glazing or unsuitability for further use as checkers either are used to close the bulkheads or are sent to other departments for reuse in heating furnaces or boilers. Under this system a furnace thus begins a campaign without the initial handicap of a partially ineffective regenerator system.

In one shop averaging over 350 heats per roof and rebuild that employs the foregoing system the individual checker brick have a life of four or more campaigns.

Fire brick is the usual material of checkerwork and the denser well-burned brands are those most sought. In some cases where the furnace or checkers are designed poorly, and where operation is faulty or accelerated, or as a result of bath enlargement, especially high-temperature conditions prevail in the upper regenerator chamber. Silica or high alumina brick frequently are used; single-burned magnesite brick, however, have been proposed in an effort to prevent the early failure of the checkers. Silica brick in some cases have been of considerable aid, but have no salvage value after one campaign. However, high-alumina brick have been successful in minimizing the effect of excessive temperature largely on account of the high salvage rate.

The economics of checkerwork are governed by three principal factors, the first cost of the checkers, the life of the checkers, and the value of the heat return. The first cost and the life are determined easily, but unfortunately it is difficult if not impossible to place value even though arbitrary on the third item.

The unit cost of checker brick of various size in place in the regener-

Table CXXVII

Unit First Cost of Checker Brick

Brick size, inches a	9-inch std. brick equiv.* b	Price extra,* per cent c	Per One Brick: Cost in cents d	Per One Brick: Trans. handling, laying, cents e	Per One Brick: Cost in place, cents f	Pieces per ft.² g	Cost per ft.,² cents h	Cost per ton brick in place i	Ft.² per ton checker work j
Open or Staggered Type									
9 x 4½ x 2½	1.00	Base	4.05	3.80	7.85	4.74	37.2	$22.12	60.5
9 x 4½ x 3	1.28	Base	5.02	4.87	9.89	4.74	46.9	23.00	49.0
Patent checker "A"	5.81†	75	41.15†	22.08†	.....	5.25	63.2	31.10	49.3
Patent checker "B"	7.72†	75	54.70†	29.33†	.....	4.59	84.0	31.10	37.0
10* x 4½ x 3	1.49	15	6.95	5.66	12.61	3.49	44.0	25.19	57.2
10½ x 4½ x 4½	2.24	8	9.78	8.51	18.29	3.49	63.8	24.19	37.8
10½ x 6 x 2½	1.66	8	7.25	6.31	13.56	2.62	35.5	24.20	68.2
10½ x 6 x 3	1.99	8	8.68	7.56	16.24	2.62	42.5	24.12	56.8
13½ x 4½ x 4½	2.88	15	13.40	10.95	24.35	2.10	51.1	25.11	49.1
13½ x 6 x 2½	2.13	8	9.30	8.10	17.40	1.59	27.7	24.20	87.4
13½ x 6 x 3	2.56	8	11.22	8.89	20.11	1.59	32.0	24.20	75.6
Chimney Flue Type, Standard Brick									
13½ x 6 x 2½	2.13	8	9.30	8.10	15.48	3.18	49.2	24.20	49.5
13½ x 6 x 3	2.56	8	11.22	8.89	18.18	3.18	57.8	24.20	41.9
15 x 6 x 3	2.84	30	14.96	10.79	23.72	2.56	60.8	28.20	46.4
18 x 6 x 3	3.41	30	17.96	12.96	29.00	1.78	52.6	28.20	53.6
Chimney Flue Type, Pointed Ends									
13½ x 6 x 2½	1.90	45	11.15	7.22	18.37	3.18	58.4	27.60	47.3
13½ x 6 x 3	2.27	45	13.33	8.62	21.95	3.18	69.8	27.60	39.5
15 x 6 x 3	2.56	75	18.14	9.72	27.86	2.56	71.3	33.15	46.5
18 x 6 x 3	3.13	75	22.16	11.90	34.06	1.78	60.6	33.15	54.7

*Manufacturer's schedule. †Per cubic foot.

ators are given in Table CXXVII. The costs of the checkerwork per cubic foot as constructed with the several sizes of brick (column h), the cost of 1 ton of checkerwork in place (column i), and the cubic feet of checkerwork that 1 ton of checker brick will develop (column j), when considered jointly indicate a wide variation in first cost.

The difference in the cost of 1 ton of checkerwork in place (column i), is attributed solely to the percentage of the "Price extra" (column c), and varies from $22.44 to $33.15. The cost of checkerwork per cubic foot includes all factors of cost and design and varies from 37.2 to 84 cents.

As the exposed surface is a measure of checker effectiveness the comparative costs of the exposed surface should be a valuable aid in the selection of checkerwork design especially if considered in conjunction with the flue area. The appropriate values are set up in columns e and f, Table CXXVIII.

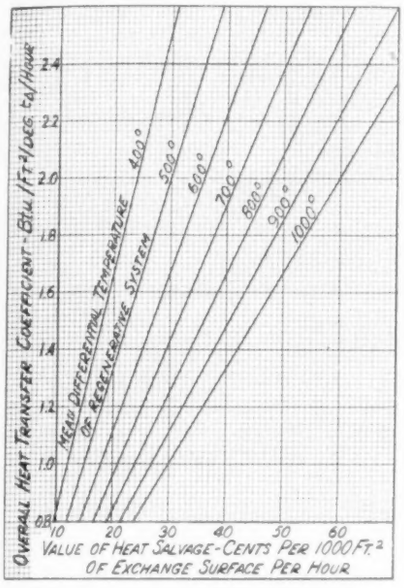


Fig. 157—Value of regenerative salvage with fuel at 30 cents per million B.t.u.

From a perusal of these columns it is evident that with a checker flue size established the cost of exposed surface is largely a matter of the checkerwork design selected. The relative costliness of the 4½-inch square checker brick is well demonstrated, and it should be observed especially that in regenerators of restricted volume a material increase of exposed surface may be secured by replacing open checkerwork with the chimney type.

While heat must be salvaged in the regenerators at whatever cost in order to develop the temperature required to carry out the open-hearth process, the economic value of the heat salvaged must be the ultimate measure of the value of one type of checkerwork over another. In order to compute the value of the heat returned to the process an overall heat transfer coefficient must be developed from the appropriate thermal and combustion data. The value of such a coefficient usually will fall within the range of 1.0 to 2.0 B.t.u. per square foot of transfer surface per degree of mean differential temperature per hour. The mean differential temperature ordinarily will range from 700 to 900 degrees Fahr. Then with the fuel cost at hand the value of the unit return may be found. The chart, Fig. 157, indicates the savings of fuel that will accrue as regenerative practice is improved. Improvement of regenerator practice will be indicated in an increase in the mean differential temperature, and contingently the overall heat transfer coefficient and money savings.

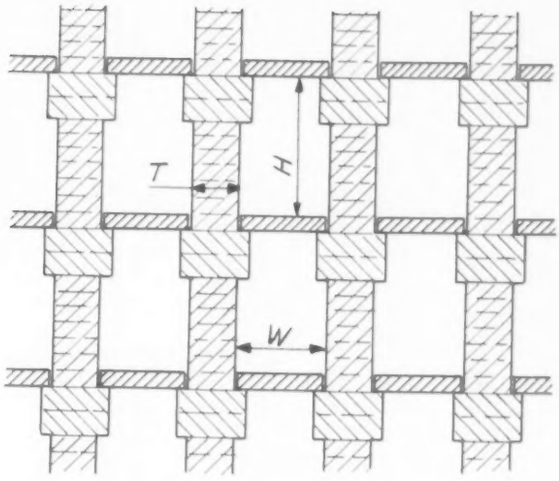


Fig. 158—Simple arrangement of horizontal regenerator flues

The design of checkerwork, with horizontal flues, Fig. 153-E, is subject to the incorporation of many more individual ideas as to detail than the vertical flue type and, consequently, no specific arrangements are suggested. A basic type is illustrated in Fig. 158 and consists of vertical walls of standard brick spanned at appropriate intervals with tile. Obviously the width of the flues, W, and the height, H, may be varied through considerable limits. Horizontal flues as large as 22 inches wide by 32 inches high and as small as 8 inches wide by 12 inches high have been installed; both designs are reported to have given excellent service and results.

Horizontal checkerwork, particularly those with large flues, may be cleaned effectively during shutdown and long life of the checkerwork is reported in all instances in which

Table CXXVIII

Volume and Cost of Exposed Checker Surface

Brick size, inches a	Exposed surface, ft.²/ft.³ b	Ft.³/1000 Ft.² exposed surface c	Cost per cu. ft., cents d	Cost per 1000 Ft.² exposed surface e	Flue area, sq. in. f
Open or Staggered Type					
9 x 4½ x 2½	3.68	272	37.2	$101.10	42
9 x 4½ x 3	3.85	260	46.9	121.95	36
Patent checker "A"	5.25	191	63.2	120.65	49
Patent checker "B"	3.65	274	84.0	230.00	56
10½ x 4½ x 3	3.38	296	44.0	130.20	56
10½ x 4½ x 4½	3.60	278	63.8	177.40	36
10½ x 6 x 2½	3.02	331	35.5	117.50	64
10½ x 6 x 3	3.11	322	42.5	136.90	56
13½ x 4½ x 4½	2.95	339	51.1	173.20	81
13½ x 6 x 2½	2.39	419	27.7	116.00	121
13½ x 6 x 3	2.48	403	32.0	128.60	110
Chimney Flue Type, Standard Brick					
13½ x 6 x 2½	2.90	345	49.2	169.80	121
13½ x 6 x 3	2.77	361	57.8	208.60	110
15 x 6 x 3	2.56	391	60.8	237.60	144
18 x 6 x 3	2.22	451	52.6	237.20	225
Chimney Flue Type, Pointed Ends					
13½ x 6 x 2½	2.90	345	58.4	201.30	121
13½ x 6 x 3	2.77	361	69.8	253.80	110
15 x 6 x 3	2.56	391	71.3	278.70	144
18 x 6 x 3	2.22	451	60.6	273.20	225

well-designed units of the type have been installed.

The dividing and supporting walls should start at the regenerator bottom as rider walls and of an appropriate thickness, T, say 9-inch. After reaching a height of two or three flues the thickness may be decreased to perhaps 6¾ inches and after two or more additional flues reduced to 4½ inches. The supports for the cross tile are developed by corbelling the brick outward as indicated. The flues may be cross connected by appropriate apertures through the walls.

The comparatively few installations of this type of checkerwork have all indicated interesting possibilities and experiments with this type should be exbanded.

Chamber Effects Discussed

The following comments are offered as leading to possible improvements in the regenerative chamber effects of the typical furnaces. They refer only to the checker arrangements as specific comments heretofore have been offered anent the arrangement of areas A_{11}, A_{12}, fantail and connecting flue design which control the distribution over and under the checkers.

FURNACE A: The checkers can be altered easily from the box type to the stepped type and 10 to 15 per cent more checker volume secured which is greatly needed. While the 9 x 4½ x 2½-inch brick may be retained in the gas chambers they should be discarded in the air chambers in favor of the 10½ x 4½ x 3-inch brick.

Further, the incorporation of chimney type flues would increase the exchange surface area by about 20 per cent.

FURNACE J: It is thought that an increase of the checker flue area particularly in the air regenerators would aid the operation of this unit.

FURNACE K: An increase of the checker flue area, it is believed, would prove advantageous in the air regenerators, in view of the fact this unit consistently is making the best producer gas fired records in the United States.

FURNACES N and O: These furnaces are handicaped by lack of checker volume, Table CIX. If chimney-type checkers having 7½ or 8-inch flues were incorporated in the gas chambers and 10½ or 11-inch flues in the air chambers it is thought operations would be much benefited.

FURNACE I: The 4½-inch square checker brick should be discarded for 2½ or 3-inch thick brick with at least 7½-inch square flues.

FURNACE P: The checkerwork design of this furnace is satisfactory.

FURNACE G: The regenerator chambers of this unit are fairly satisfactory.

FURNACE L: The 4½-inch square brick should be discarded in favor of thinner brick developing at least 10½-inch square flues in the first pass and 7½-inch square flues in the second pass.

FURNACE B: The primary checker chambers are too small. However, the enlargement of the flues to receive the auxiliary checkers has developed good fuel and production results in this unit.

FURNACE D: The 4½-inch square brick should be discarded in favor of the 9 x 4½ x 2½-inch standard brick if the furnace is now operated on coke oven gas.

FURNACE E: The checker chambers are much too small. The 4½-inch square brick should be replaced with chimney-type checkers having 10½ or 11-inch square flues.

FURNACE H: While the chambers are too small, the present arrangement of checkerwork is probably the best that can be installed.

FURNACE F: The relocation of the idle pass to conform to the C-1 design, Fig. 153, and the arrangement of the checkerwork as in furnace L probably would improve the operation of this unit which is claimed to be satisfactory at present.

FURNACE M: The use of 4½-inch square brick should be discontinued and 2½ or 3-inch brick to develop 7½ or 8-inch square flues substituted. The chimney-type flue would increase the heating surface about 2[illegible] per cent over the open type.

(To be continued)

Tomorrow's Machine Tools

(Concluded from Page 35)

inner sanctum of the toolroom must come forth into the big shop. Air conditioning also is destined to play a part, not only from the standpoint of comfort, but also to promote accuracy.

Machine Tool Show Displays Courage

AFTER a depression such as this country has just passed through, one is amazed at the courage of machine tool manufacturers to embark on such an extensive program of machine exhibition, J. R. Cox, director of manufacturing, Thompson Products Inc., Cleveland, told members of the Society of Automotive Engineers attending the society's production meeting at Hotel Statler, Cleveland, Sept. 18, in connection with the National Machine Tool Congress. The speaker, in giving his impression of the Machine Tool exposition, mentioned that the show depicted the results of two industries, namely the machine tool and automotive industries, to win the customers' dollar.

Despite the fact that the automotive industry has been requiring close tolerances, machine tool manufacturers have been able to handle the requirements. One of the improvements noticeable in the machine tool industry, Mr. Cox pointed out, is the wide use of high-nickel alloy cast iron particularly in the heavy parts. Roller bearings also are being employed more.

Multiple V-belt drives practically have replaced flat belt drives, he said, over 40 per cent of the machines on display being driven by V-belts. He emphasized that most of the machinery at the show was equipped for pressure lubrication. Most of the larger machines, he related, have push-button control so that operators are required to exert less physical effort per piece produced.

Almost all exhibits of cast iron and nonferrous metal used cemented carbide tools. After citing various applications of surface broaching seen at the various booths, the speaker mentioned that this type of machining may go a long ways toward replacing form milling. In closing, Mr. Cox stamped the show as the greatest exhibition of mechanical art the world ever has seen.

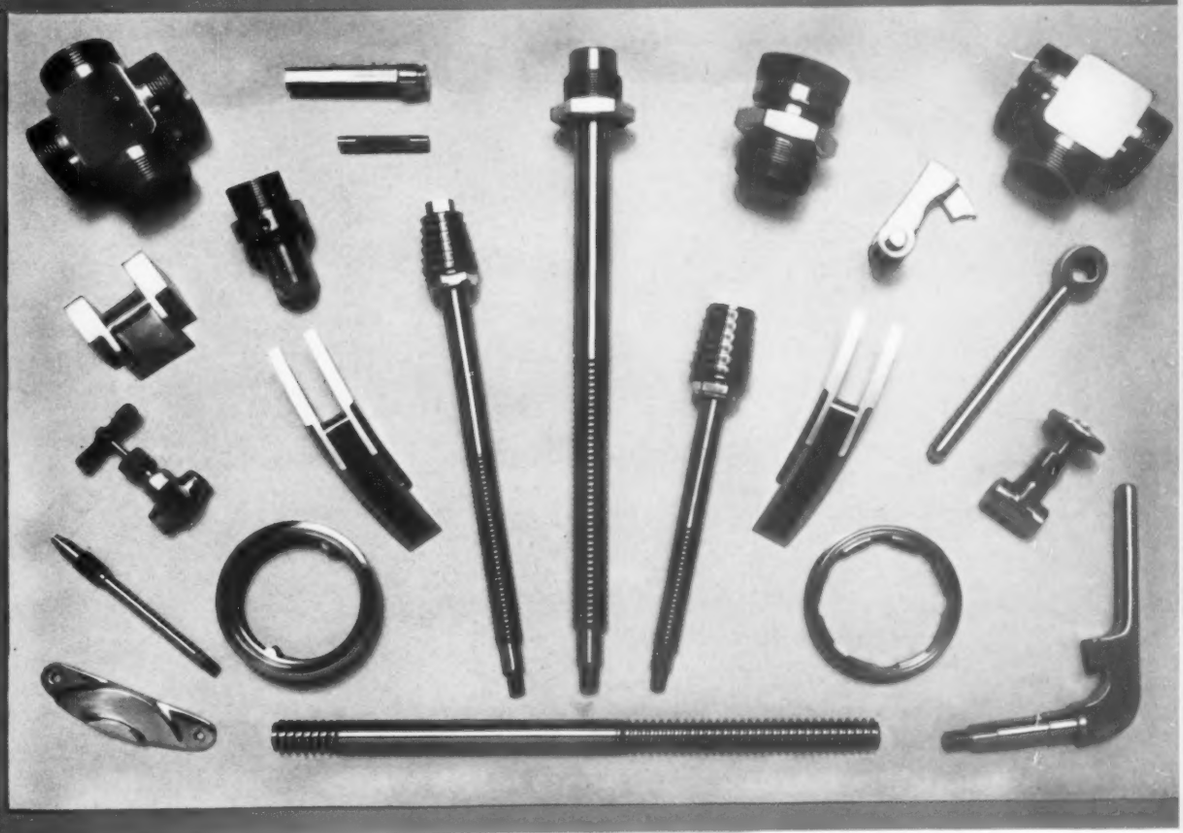
E. P. Spruance, American Chemical Paint Co., North Ambler, Pa., in discussing "Rustproofing and Paint Adherence Technique," described a newly developed chromate treatment, known as the Cromodine process, for rustproofing steel parts in general. The treated surfaces become coated with an extremely thin film of iron chromate which is little more than discoloration; yet it serves to polarize the anodes, and to stop the flow of surface currents that lead to rust, he explained.

The steel first is cleaned and oil removed; but unlike most other treatments careless cleaning is not so harmful, because it is not necessary that every trace of oil and drawing compounds be cleaned away. After the cleaning operation the surface is wet for 1 minute with the Cromodine solution.

The actual Cromodizing part of the process, the speaker pointed out, may take place in a tank in which the steel materials to be treated are dipped in Cromodine solution heated to 180 to 190 degrees Fahr.; or may take place in a compartment through which the steel pieces pass on a conveyor, and are sprayed with Cromodine solution at the same temperature as is used in the bath method. Following either the dip or the spray method of treatment, the steel surfaced is rinsed and dried. The sur-

(Please turn to Page 48)

BETHADUR AND BETHALON



offer a grade of stainless steel for every use

TO AN ever-increasing extent industry is turning to stainless steels to carry the burden of resisting heat, acids, the attacks of the atmosphere.

Three major considerations govern the selection of a grade of stainless for any given task—the corrosive agents that it must resist, the fabricating operations it must undergo, the physical properties it must possess.

Bethadur in nine grades and Bethalon in two grades offer the opportunity to obtain any desired combination of properties. These steels, developed in Bethlehem Steel Company laboratories, cover the entire range of materials commonly referred to as stainless steels and irons.

Each of the nine grades of Bethadur is as well fitted for certain uses as the well-known Bethalon is for intricate machined parts that must resist corrosion. The general characteristics of each of these steels are given on the following page. For detailed information on their properties and working, send for booklet on Bethadur and Bethalon.

Bethlehem also makes the lower-chromium-type steels of the stainless group, containing from 4 to 6 per cent chromium with various additions of molybdenum, tungsten and vanadium.

Prominent among Bethlehem Stainless Steel Products are the following: Bars, hot-rolled, cold-drawn, centerless-ground and polished; Plates and angles; Forgings, drop and hammer; and bolts and nuts. A specialty is made of highly polished bars for the pump and valve industry.

BETHLEHEM STEEL

BETHADUR 1

BETHADUR 1 is of the standard stainless-iron type. It possesses excellent corrosion-resisting properties in either the heat-treated or annealed condition. It is readily forged, can be machined without great difficulty, and may be heat-treated to secure high physical properties.

BETHADUR 2

BETHADUR 2 is the type commonly known as 18-8 stainless steel. It finds application where extreme resistance to atmospheric corrosion is required, particularly in ornamental parts which must retain their lustre over long periods of time without frequent cleaning and polishing. It is non-magnetic.

BETHADUR 3

BETHADUR 3 is primarily an acid-resisting steel and shows very little loss in weight when subjected to sulphuric or hydrochloric acid in mild concentrations. Therefore, it finds particularly wide use in chemical-plant apparatus, pickling equipment, and similar applications.

BETHADUR 4

BETHADUR 4 is similar to Bethadur 1, in that it requires no heat-treatment to bring out its maximum corrosion-resisting properties. Bethadur 4 is suitable for applications where high resistance to atmospheric attack is required, but where physical properties are relatively unimportant.

Bethadur 4 is particularly recommended for exterior trim, ornamental objects, and all other purposes not requiring the exceptionally high corrosion-resistance of Bethadur 2.

Bethadur 4 is the most malleable of all straight chromium-iron alloys. This property makes it particularly fitted for purposes where drastic cold work is encountered.

Bethadur 4 is an excellent heat-resisting steel. Under continuous service it will resist oxidation up to about 1200 deg. F., and will stand temperatures up to 1600 deg. F., for short periods of time without scaling.

BETHADUR 5

BETHADUR 5, with unusually high chromium content, is intended for use where exceptional corrosion-resistance is required, or dilute acids encountered. It is extensively used in the nitric-acid industry.

Bethadur 5 is sometimes used as a heat-resisting steel, though the higher carbon content of Bethadur 9 makes the latter alloy more desirable from a strength standpoint.

BETHADUR 6

BETHADUR 6 is the hardening grade of corrosion-resisting steel, sometimes called the cutlery grade. It is used in the manufacture of non-corroding parts that must be hardened.

BETHADUR 7

BETHADUR 7 has a high carbon content, making it suitable for parts in which a higher degree of hardness is needed. It is commonly used where hardness or abrasion-resistance is required in the presence of steam, water, salt water, mine water, oil and oil products.

Where extreme hardness is required the still-higher carbon Bethadur 8 should be used.

BETHADUR 8

WITH Bethadur 8 a maximum Rockwell "C" scale hardness of 60 can be obtained when the steel is quenched at temperatures in excess of 1850 deg. F. Other characteristics are the same as those of Bethadur 7.

BETHADUR 9

WHILE Bethadur 9, because of its high chromium content, is a corrosion-resisting steel, it is primarily intended for use in parts subjected to high temperatures.

Temperatures as high as 2100 deg. F. do not oxidize or scale the surface of Bethadur 9.

BETHALON

BETHALON A

BETHALON A, while easy-machining, possesses all of the excellent corrosion-resisting properties of straight carbon-chromium irons.

Bethalon A can be turned, drilled, bored or threaded as easily as ordinary screw stock, with the same tool set-up and the same feed, speed, and depth of cut. Excellent threads can be cut at 150 to 175 surface ft. per min.; it can be smooth-turned at 200 surface ft. per min.

BETHALON B

BETHALON B possesses corrosion-resisting properties equal to those of Bethadur 2, and is recommended for all uses where the rapid performance of intricate machining operations is important.

Bethalon B is not quite as machinable as Bethalon A, and must be machined at a somewhat lower speed than screw stock, though approximately twice the cutting speeds of standard 18-8 stainless can be used. The cutting speed is to some extent dependent on the type of screw-machine used, but speeds of from 80 to 90 surface ft. per min. can be maintained without the necessity for too frequent regrinding of tools.

Bethlehem District Offices: Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Milwaukee, New York, Philadelphia, Pittsburgh, San Antonio, St. Louis, St. Paul, Washington, Wilkes-Barre, York. *Pacific Coast Distributor:* Pacific Coast Steel Corp., San Francisco, Los Angeles, Seattle, Portland, Salt Lake City, Honolulu. *Export Distributor:* Bethlehem Steel Export Corp., New York.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

Steel Mill Engineers Hear of Progress in Mechanical and Electrical Equipment

WHAT makes the 1934 record of main roll drive motors unusual is the fact that all but six of the 53 motors installed were in conncetion with hot and cold strip or sheet mills. Eighty-five per cent of the horsepower installed last year was used in the production of sheets and strip. This is another indication of the trend in steel production at present.

These facts were brought out at the opening session of the thirty-first convention of the Association of Iron and Steel Electrical Engineers held in the William Penn hotel, Pittsburgh, Sept. 24-26, by W. H. Burr, electrical and mechanical superintendent, Lukens Steel Co., Coatesville, Pa.

Designs for hot strip mills now on order were characterized by Mr. Burr by the use of greater power and by the provision of higher delivery speeds. Until this year, he stated, no continuous hot strip mill had more than 3500 horsepower motors on the finishing stand. Three mills now under construction will have finishing stands driven by 4500-horsepower motors. Another mill scheduled to go into operation this year will have a maximum delivery speed of 2000 feet per minute, an increase of about 30 per cent over previous practice.

Motor Room To Be Cooled

The ventilating and cooling system of Bethlehem Steel Co.'s. 79-inch mill at Lackawanna, N. Y., was cited by Mr. Burr as somewhat of a departure from previous types. The hot air discharged by the motors and generators will be drawn into hot air ducts in the basement, then through finned surface coolers which will extract the heat from it, and then the cool air will be delivered to the motor room. This means that the motor room will be the coolest place in the ventilating system, thus conducive to long life of the apparatus and comfort of the operators.

The tandem cold strip mill of the Ford Motor Co. is reported to be designed to operate at a higher delivery speed than any existing mill rolling the same class of material, the speaker stated. This mill also is distinguished by the fact that the main mill motors have a greater total capacity than those of any other cold strip mill so far built. This mill, Mr. Burr mentioned, will be provided with special electrical equipment for automatically measuring and regulating the tension in the strip between the roll stands.

This mill also will be served by a cylindrical bell-type furnace for annealing coiled steel strip which is the largest furnace of this type so far built. It is designed to take coils with a maximum outside diameter of 52 inches in stacks 96 inches high, giving it a capacity of about 16 tons per charge.

In conclusion, Mr. Burr stated that there is a move under way to change the name of the Association of Iron and Steel Electrical Engineers. The plan has been considered by the advisory committee, and shortly will be submitted to the board of directors and then to the membership for approval.

DEVELOPMENTS in the flat rolling industry, as outlined by Stephen Badlam, consulting engineer, Pittsburgh, brought out the fact that at present there are 19 continuous wide strip mills built or authorized in this country. It is reported, he stated, that four additional mills are under consideration. Mills of this type in this country have a total annual capacity of 9,000,000 tons.

The 42-inch continuous strip mill of the Carnegie Steel Co., McDonald, O., is of the same general type mill as was built in 1931 but is characterized by being the heaviest powered mill and with the highest finishing speed of any unit in this country. The mill will take slabs up to 36 feet long and will finish off at a speed ranging from 1000 to 2000 feet a minute.

Mills today are built with much faster finishing speeds, Mr. Badlam pointed out. When the continuous mill was built at Butler, Pa., 1000 feet per minute was the maximum; the American Sheet & Tin Plate Co.'s mill at Gary will finish at 1750 feet per minute.

Sleeve-type roll neck bearings now are coming into wider use, Mr. Badlam pointed out. Two mills now under construction will be equipped with bearings of this type. The 3-high water lubricated mill offers a good field for the nonmetallic bearing, in the speaker's opinion.

C. L. McGRANAHAN, superintendent, 76-inch hot strip mill, Inland Steel Co., Indiana Harbor, Ind., in presenting a paper on "The Flat Rolling of Steel" received prolonged applause. The frankness with which details associated with the rolling of broad strip were related to the audience, which included many finishing mill executives, was widely acclaimed. To reduce a broad strip to gage in a modern mill is not an extremely difficult task, the speaker contended. To produce a strip of the proper surface requirements, however, and of such a shape that it can be flattened without destroying this surface, is easy or difficult, depending upon the amount of thought that has been given to the selection of the slag, the rate of heating, the percentage of draft in the various stands of rolls, and the condition of the working and backingup rolls, when the piece is being rolled.

Defects Vary with Gage

The speaker cited the various defects which arise in the ingot after pouring and mentioned that many of these can be removed by soaking at the proper temperature. Defects in finished sheets, he contended, usually are in proportion to the gage. Slabs charged in the reheating furnace in a cold state can be descaled more easily, he asserted, than those charged hot and brought up to the proper rolling temperature. When slabs are heated properly, he continued, the impact of the water sprays is sufficient to remove the scale.

He classed the flying shear as the most important piece of equipment in the modern broad strip mill and recommended placing it adjacent to the last stand of the finishing mill train inasmuch as tremendous tonnages can be handled under this arrangement.

In discussing dirty cooling water Mr. Granahan warned that if the water is not clear the rolls in stands Nos. 5 to 7 tend to become marked, the cooling sprays will become

clogged and the section delivered will not behave as it should in the next stand of rolls. The speaker advocated the use of a detached universal spreader inasmuch as it affords a greater amount of edging and prevents undue stretching of the piece because of the variation of speed.

Tonnages heavier than 13 gage are out of proportion to those that can be coiled and decoiled, he contended. Gages from 14 to 20 are ideal for coiling and decoiling by machine but in the speaker's opinion the heavier gages should be cut on the flying shear.

In discussing heavy drafts, Mr. McGranahan mentioned that there is a temperature at which the product in the process of reduction flows uniformly; if the temperature is too low the surface of the steel will tear. Excessive drafts, he warned, produce needles on the surface of slabs and fire cracks on the surface of the rolls.

IN discussing "Roll Table Equipment for Wide Strip Mills" G. A. Caldwell as co-author with S. F. Henderson, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., mentioned that bevel gearing has been eliminated and individual motors of the squirrel-cage induction type are used to drive each roll or pair of rolls either direct connected or through suitable gearing. On a mill now being installed about 900 motors will be used, representing a connected load of 2600 horsepower.

On the mills in this country placed in service during the past year and those which will be installed during the coming year about 4000 motors will be required, representing a connected load of more than 10,000 horsepower. The present wide strip mill not only requires a long, heavy roll but also that part of the motors be capable of rapid acceleration and retardation. The size of the motors, the speaker said, has been increased greatly and a mill now under construction will have some rolls that will be driven by 10-horsepower motors.

On modern strip mill installations where the table motors start and stop as often as twice a minute the losses are extremely important, the speaker warned. By proper application of certain fundamental principle these losses can be reduced materially.

ROLLS primarily are classified into two general types—iron base and steel base—stated J. L. Campbell who as co-author with S. H. Griffiths, Ohio Steel Foundry Co., Lima, O., spoke on the "Manufacture of Iron and Steel Rolls." Plates, skelp, strip, sheets and tin plate receive most of their reduction on chilled cast iron base rolls in the hot mills. On cold mills chilled cast and hardened forged steel rolls are used, the speaker stated. Chilled cast rolls have been developed with a surface hardness of 90 to 95 scleroscope and hardened forged steel rolls 100 to 110 scleroscope.

Hot strip mills use chilled cast iron base working rolls for the most part. Where the design of the mill is such that deflection of the rolls and reductions for each stand are not excessive, he stated, the clear chilled alloy iron rolls are used throughout. Other mills are known to use the condensed grain type throughout when greater strength is required, while still others employ the use of both.

Steel base rolls, he continued, come into use in the flat rolling of steel in blooming, slabbing and bar mills. They also are used in backingup rolls in 4-high strip mills. The manipulation and use of alloys along with improvement in foundry and heat treating practices have resulted in better steel base rolls, the speaker contended.

Blooming mill rolls are being developed, Mr. Campbell said in conclusion, that will give greater wear and at the same time be resistant to slippage and fire cracking. In conclusion, he announced that special hardened steel base rolls at present are in the stage of development and experimentation.

ROLL oils or those which are used on a strip of steel passing through a finishing mill, during the final stages of processing, are introduced for several reasons, according to Dr. R. H. Moore who with E. S. Reynolds, Socony-Vacuum Oil Co., New York, presented a paper entitled "Lubricants for Cold Rolling Strip Steel." He emphasized that the primary object is to minimize friction between the strip being rolled and the work rolls of the mill. Oils thus used, he stated, form an oil wedge and act in many ways as a lubricating oil does in the pressure area of a sleeve bearing. As the strip attains its final gage and goes into the coiler, he pointed out, the roll oil must provide a protective coating on the strip so that there will be practically no surface to surface friction between the turns of the coil, should there be a tendency for the coil to loosen and unwind, as this would tend to scratch the surface.

Soluble oil, which is purely a combination of mineral oil and a saponifying agent, has become one of the leading roll oils, he asserted, as the mill speeds have been increased.

Rolling speed probably is one of the more important factors in the selection of a roll oil, the speaker declared. For example, a strip being rolled at a speed under 100 feet per minute would call for an oil having high film strength and probably a certain amount of coolant. On the other hand, he continued, a strip being rolled at 900 feet per minute would require a large amount of coolant and probably little film strength.

IN speaking on "Individual Drives for Runout Table and Coiler Rolls," W. B. Snyder as co-author with L. E. Hildebrand, General Electric Co., Schenectady, N. Y., referred to the relative merits of plugging and dynamic braking as the means for bringing runout table motors to rest. If the motors are to be decelerated from high speed, the speaker recommended dynamic braking inasmuch as the reduction in deceleration losses usually will produce material saving in the cost of both motors and motor-generator sets.

However, if the drive operates over a wide speed range, and is decelerated to minimum speed by lowering the frequency and voltage, then the reduction in total losses by using dynamic braking rather than plugging is inappreciable, and the choice of the method of final stopping is determined by the operating requirements. For coiler drives the speaker strongly recommended dynamic braking.

IN TIME probably all hot strip manufactured in this country will be uncoiled and placed in a state of cold plasticity by roller leveling, according to R. J. Wean, president, Wean Engineering Co. Inc., Warren, O. It is likely, he contended, that many products can be made from hot-rolled strip that previously required additional treatment and he cited barrel stock as an illustration.

Greatest demands on the flat rolled producers have been made by the automotive industry. Deep drawing qualities and surface conditions unobtainable a few years ago now are required by the modern automobile, he stated. Steel tops as well as multiple press work, require widths and lengths of sheets with improved ductility and free of stretcher strains. Development of machinery for the prevention of stretcher strains and of strip processing equipment to accomplish the same results have been important factors in the application of these large sheets without strains or surface blemishes.

Mr. Wean described the Budd-McKay type machine for removing stretcher strains and the McKay uncoiler for placing strip in a state of cold plasticity both of which now are in wide use in this country.

ARTHUR H. YOUNG, vice president, United States Steel Corp., New York, speaking on "Industrial Relations," was of the opinion that

what constitutes proper industrial relations machinery can be and will be given only by Mr. American Workman himself. If the workman is assured a square deal, he will not permit dictation by an alien group and have his rights as an individual or member of a group substituted, Mr. Young asserted.

Employe representation, he added, is a living, humanized, vitalized and continuous contact. We get an understanding of conditions we must meet and the problems that we must solve that is entirely mutual. We get far better understanding by each side of what is on the other side's mind. Out of the new joint contact, he said, comes unity of purpose and unity of effort resulting from mutual understanding, respect and confidence.

Just as the function and the technique of the safety engineer and the electrical engineer have changed mightily in a short span of time, the functions and program of industrial relations will continue to change. Mr. Young declared that the pendulum of change will swing over a far wider arc in this sphere than it will in any other line of endeavor. Industrial relations are human relations, he emphasized.

Solutions from Remote Points

We hear much discussion these days about "the labor problem" and many "solutions" of the problem are offered from sources sometimes near to, but more often actually remote from the point of real concern—namely, the man on the job and management of the company for which he works.

We are told that the day of rugged individualism has passed and in its place has come some sort of collectivism which usually in its description approaches the form of state socialism. We are told that the worker's principal concern today is security—of life, of livelihood, for his children and assurance of his and their abundant life—and that he must look for these benefits to guarantees furnished by our political government.

And we are told, Mr. Young continued, of this as a discovery, and that it is something new, emerged out of a recent cataclysm. It is a patent fallacy that the security of life is a newly-discovered wish on the part of the man on the job or his employer.

Mr. Young recited the movement for security in the worker's old-age and other pension plans of the United States Steel Corp. and other large concerns, pointing out that the Steel coporation has expended more than $60,000,000 in direct pension payments to its retired employes. Thousands of employes are the owners of homes bought under the company's plans. They carry more than $300,000,000 of life insurance, he declared.

In conclusion Mr. Young emphasized that the American workmen themselves have worked out the answer to the problem in a manner which has made our industrial prestige, the standard of living of our employes and the worth of American citizenship the marvel and envy of the whole world.

Glimpses of Iron and Steel Exposition

NEARLY everything necessary for the successful operation of a modern steel mill was displayed at the Iron and Steel exposition held in conjunction with the thirty-first convention of the Association of Iron and Steel Electrical Engineers at the William Penn hotel, Pittsburgh, Sept. 24-26.

Mechanical handling devices such as lift trucks, roller conveyors, and models of cranes; oils and greases for keeping the wheels of the steel industry moving; electrical equipment of all types; ball and roller bearings; recording instruments that check on B.t.u.'s; gears, valves, controllers, breakers, motors—all this and much more caught the eye of operating and maintenance men.

Attendance was gratifying; sales and inquiries reached a new high for recent years.

♦ ♦ ♦

Registrations were heavy during Tuesday morning, Sept. 24, and a large number of the visitors to Pittsburgh came from Cleveland and Chicago, with a fair sprinkling of representative Easterners. Among the Canadian visitors to the show were: Will B. Baltzer, chief engineer at Canadian Steel Co., Ojibway, Ont.; W. E. Foreman, Toronto, Ont.; W. F. Shortall, Canadian General Electric Co., Toronto, Ont.; F. Smallwood, Algoma Steel Co., Sault Ste. Marie, Ont.; and B. A. Shrine, Steel Co. of Canada, Hamilton, Ont.

♦ ♦ ♦

Timken Roller Bearing Co. showed a backup roll neck bearing which it made for the 36 x 52 x 96-inch broadside mill for the Zaporojstal Steel Works, Russia. Alongside was a 21 x 38 x 19½-inch tapered bore bearing which Timken built for the 21 x 45 x 43-inch strip mill for Carnegie Steel Co. at McDonald, O.

♦ ♦ ♦

Many of the exhibits were not ready by 2 p.m. Tuesday, Sept. 24; nonetheless, a stream of visitors poured through the two floors by early afternoon. The number of the exhibits was more than two years ago when the show was last held in Pittsburgh. By actual count there were 117 exhibitors, or about 20 more than at Cleveland in 1934. Exhibition space was at such a premium, in fact, that seven exhibitors had to set up their booths in the lower hallway between the main exhibition hall and the William Penn hotel entrance.

♦ ♦ ♦

Youngstown Sheet & Tube Co.'s model exhibit of its 79-inch continuous strip mill attracted a large number of visitors. Laborers worked frantically late through the night of Sept. 23 to set up the model mill, which weighs 3 tons. It was torn down on Thursday, Sept. 26, and sent to the National Metal exposition in Chicago, opening Monday, Sept. 30.

♦ ♦ ♦

Other model exhibits also captured the attention of visitors. Alliance Machine Co. showed models of a pipe pickling tank, open-hearth charger, and an intricate scale model of a freight car unloader in operation. Morgan Engineering Co. had a number of crane models operating.

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Socony-Vacuum Oil Co. introduced a marine influence at the show by exhibiting a model of the NORMANDIE, among lubricating displays more closely affiliated with the steel industry. Mathews Conveyer Co., Ellwood City, Pa., in three striking color views set up in the background of its booth, showed conveyor systems in operation at Allegheny Steel Co., Inland Steel Co. and the Overholt Brewing Co.

♦ ♦ ♦

Visitors clambered around the booth of Gatke Corp., Chicago, which had a section of a 16-inch molded roll neck bearing cut away, exhibiting the strands which are employed in the manufacture of the molded bearing base. Visitors were asked to guess how many strands were in the sample, prize for the closest guess being a set of matched Bobby Jones iron golf clubs.

♦ ♦ ♦

Playing around of the arc on local areas, resulting in consumption of current carrying and adjacent parts has been replaced by scientific control of the arc, which keeps it moving at high speed and ever widening its terminals until it is stretched to the rupturing point. This has been accomplished by the development of a new line-arc contactor (STEEL, Sept. 23, p. 44) which causes the arc to break clean as was demonstrated by the Electric Controller & Mfg. Co., Cleveland.

Ore, Furnace Technique Must Develop Together

BY E. W. DAVIS
Superintendent, Mines Experiment Station,
University of Minnesota

TESTIMONIES given by experts in the mine tax valuation case at Duluth last summer agreed quite closely that the life of the merchantable ores on the Mesabi range was from 36 to 40 years. These figures are computed on the basis of no increase in demand in the future. The other mining regions of the Lake Superior district will probably be exhausted sooner than the Mesabi range.

If we knew that at the end of 30 or 40 years the iron ore of the Lake Superior district would be exhausted and that all the industries which exist only because of this ore would cease to exist, the future would indeed look dark.

The reason it does not look dark is because we believe that the low-grade ore can be utilized for the manufacture of steel at a cost which will compare favorably with the cost of producing steel from the high-grade ores.

In other words, we have faith that the metallurgists and engineers of the future will develop methods for the use of this low-grade ore by the time it is needed by steel industries.

Ore Industry Will Change

However, the new developments which must be made before the low-grade ores can be utilized economically cannot all be made in the mining and beneficiation operations. The smelting and refining operations must also be improved.

Just which direction these new developments will take cannot, of course, be stated, but it is certain the ore-producing industry of the future will be on quite a different basis from the industry of the present.

When the direct furnace ore is exhausted, concentrate will be the product sent to the smelting plants. Blast furnace operators will no longer be able to specify the kind of ore they want. It will be necessary for them to develop means for smelting the kind of ore which can be furnished to them.

We, of course, cannot know now just what new developments are going to be made in the science of iron ore benefication, but we do know the nature of the raw materials which are available, and, therefore, we can reach some conclusion as to just what can and what cannot be accomplished.

In 35 years we cannot hope to reduce the cost of smelting through introduction of any great revolutionary change in the art of iron making which will be developed to a point which will permit 30,000,000 tons to be produced annually. It would take many years to build up such a large industry based on a new and untried process even if we had the process completely worked out in the laboratory.

Other Expected Improvements

The physicists have been able to bombard a molecule of iron oxide with a stream of electrons and produce pure iron without the use of heat or reducing agents, but not even the greatest optimist would expect this operation to be developed on a tonnage basis within the next 35 years. We can, however, expect greater efficiency, cheaper power, and a more efficient use of existing heating and reducing agents.

A project is already quite well worked out which produced cheap hydrogen from the North Dakota lignites. This gas may be delivered by pipe line to the Minnesota iron mining districts, and it may be possible to convert the iron oxide into metallic iron before shipment. Another project intended to produce both cheap hydrogen and oxygen by the electrical disassociation of water from power generated from the wind is well along in the experimental stages. Perhaps the oxygen can be used to enrich the blast in existing furnaces. These are examples of the types of improvements to be expected within the next 35 years.

If the present type of blast furnace is to continue in use, the iron ore required in the future must have most of the characteristics of the ore used at present. If the fundamental principles upon which the blast furnace operates are unchanged, the gases must pass upward through the ore for its reduction and preheating. This means that the column of ore must have a structure which will permit large quantities of gas to pass through it.

Since most of the concentrate which can be produced from the low-grade ores will be very fine, agglomeration on a large scale will be required. Agglomeration by existing processes would increase materially the cost of producing pig iron.

For the benefication of low-grade ores the processes are quite well worked out, and this operation could be carried on at a reasonable cost with what we know at the present time. As a matter of fact, this fine iron concentrate has already been produced commercially from one variety of low-grade ore at a total cost of about $3.50 per ton, including mining, beneficiation, royalty, taxes, and all other direct operating charges.

Abstract of "Practical Application of Iron Ore Beneficiation to Blast Furnace Practice," presented at the annual metal mining convention, western division, of the American Mining congress, Chicago, Sept. 23-27. For further reference, the reader's attention is called to "Iron Ore for Centuries in Mesabi Range," by the same author, STEEL, May 8, 1933.

Report on Sessions of Machine Tool Congress

(*Concluded from Page* 42)

face then is wiped with a tack rag, and enameled or lacquered as desired.

This process affords low cost of operation and an excellent rustproofing for steel parts that will be subject to bending and denting after painting, Mr. Spruance stated. The important feature stressed by the speaker is the flexibility of the chromate surface. Unlike other corrosion registers, bends will not crack the surface, or buckling will not make it chip off and cause paint failure. In short, the chromate coating becomes an integral part of the metal, as elastic as the metal itself. In conclusion, the speaker pointed out that the process designed for cold rolled steel to prevent rusting under paint also is effective in accomplishing the same result on hot rolled or forged steel, and on castings.

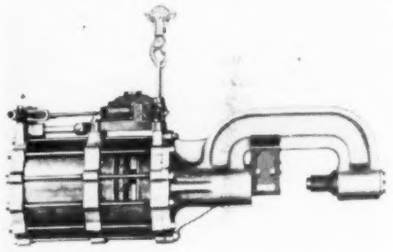
The induction method for heat treatment of steel will be used on a much wider basis in the near future stated E. L. Bailey, electrical engineer, Chrysler Corp., Detroit, who spoke on the "Application of Induction Heating in Automotive Production." He cited 30 minutes as the time usually given to draw a certain $1\frac{1}{2}$-inch shaft by the lead pot method to insure complete change in the mass of metal. By induction 8 minutes was sufficient time to obtain the same results, as the heat is produced at low frequencies practically throughout the mass.

Paint drying is perhaps the latest practical process making use of induction heating, the speaker stated.

NEW EQUIPMENT

Portable Pneumatic Press—

Hanna Engineering Works, Chicago, has added a new portable pneumatic press to its line of products. Although designated to fill the need for a portable tool for pressing spring shackle bushings and pins in automobile chassis frames, it is finding rather general application for pressing, punching, riveting, upsetting and marking operations. The press illustrated is tooled for pressing shackle bushings in chassis frames. Equipped with a hopper feed for the bushings the operator need only locate the index pin in the chassis frame, operate the valve trigger and the bushing is driven in with a predetermined pressure. It is available in capacities of 3, 4 and 5 tons, and while standard yokes of



Portable pneumatic press built by Hanna Engineering Works

varying reach and gap are offered, yokes usually are designed to fit the job.

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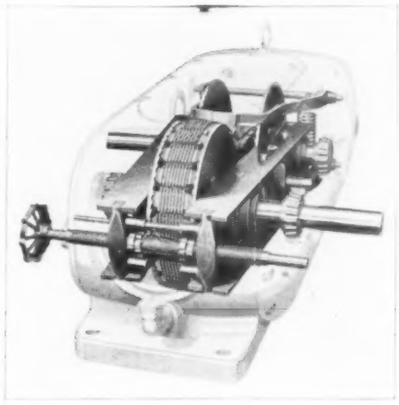
Toolroom Lathes—

Reed-Prentice Corp., Worcester, Mass., is announcing new model toolroom lathes available in 14, 16, 18



Link-Belt variable speed transmission embodies new features

and 20-inch sizes. The accompanying illustration shows the 14-inch model with 16½-inch swing and 16 speed sliding gear head. Speed changes are effected by sliding gears mounted on multiple splined shafts operated by four levers at the front of the headstock. Leadscrew reverse mechanism is built in. Separate clutch control is provided in the apron for longitudinal and cross feeds.

• • •

Motorized Variable Speed Transmission—

Link-Belt Co., Chicago, announces that in order to meet the demand for greater range and flexibility of application new features have been incorporated in its P.I.V. gear variable speed transmission, depicted above. These permit the entire line to be furnished in the following combinations and sizes: Motorized (when desired) with motor as integral part of unit; with of without speed reduction gearing; with horizontal or vertical box; and in 5 sizes up to 15 horsepower capacity.

• • •

Polishing Wheel—

Carborundum Co., Niagara Falls, N. Y., announces a new type of polishing wheel which is being advocated for use in connection with its Aloxite Brand TP and Carborundum polishing grain for all classes of metal and glass finishing work. The Columbian polishing wheel, shown

New type polishing wheel brought out by Carborundum Co.

herewith, is made in three densities or grades, soft, medium and hard. A distinctive feature is the metal hub, machined accurately, built into the wheel and perfectly centered. The new unit can be furnished with special wheel faces as may be required for polishing and finishing formed parts.

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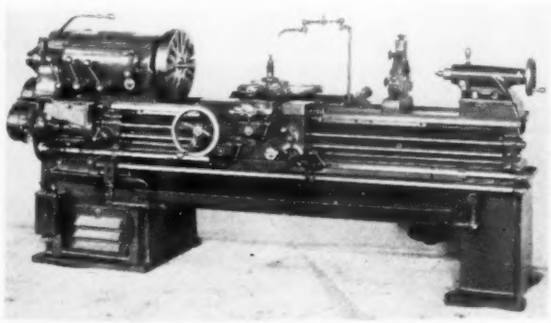
Millwright Truck Equipped With Double-Drum Winch—

Mercury Mfg. Co., 4100 South Halsted street, Chicago, is offering a new model high lift industrial truck



Left—Sixteen-speed sliding gear head lathe developed by Reed-Prentice Corp.

Right—Mercury high lift industrial truck designed for millwright use

designed especially for millwright use. The unit, shown on page 49, may be employed for moving and setting heavy machinery, etc. A double-drum winch mounted above the battery compartment, has a capacity of 4000 pounds. Cable sheaves are provided for convenient handling of any type of equipment to be moved. The truck is a 6000-pound capacity model, equipped with 4-wheel trailing axle.

• • •

Grip Lifter—

Shaw-Box Crane & Hoist Co. Inc., Muskegon, Mich., has brought out a safe, positive grip lifter for handling plates, shapes, columns and structural fabricated material. The device,

Shaw-Box device for handling steel plates, columns, piling, etc.

shown herewith, is available in two sizes. Capacity with $\frac{5}{8}$-inch throat is 5 tons and with a $1\frac{1}{2}$-inch throat 10 tons. It is attached to a crane or hoist by cable connection through an eye. By pulling a lever downward sliding bars and a roller are lifted on an inclined surface so that the full opening in the throat of the grip lifter can be placed over the marginal edge of the plate, column or other work to be handled.

Dawes Stands on Steel as Indicator

(*Concluded from Page* 12)

sumption that business felt that the last three depressions started with the stock market crashes which preceded them.

To find out how long the 1873 and 1893 depressions lasted, and what they indicated as to the length of this one, he superimposed the three on a chart as if they had all started at the same time, using the market course of heavy durable goods as the index. The results forecast a sustained rise in demand for such goods in June or July of this year.

Another chart, prepared more recently in a similar manner using stock market prices, shows equally corroborative indications, according to the general. He pointed out that the lack of satisfactory and reliable statistical records in the iron and steel industry for the major depressions in the United States preceding the depression of 1873 prevented the application to them of this method of charting.

Outlines Five Conclusions

General Dawes drew the following conclusions from these charts:

1. "That the three last major depressions in the United States, regarded as commencing respectively in the stock exchange panics of Sept. 18, 1873, May 4, 1893, and Oct. 29, 1929, registered the approach of the final year of business recovery in a sustained rise in stock exchange prices, lasting in no case less than six months, in an interval of time to approximately five years and six months, the maximum variation being within 30 days.

2. "That in each case approximately 90 days after the commencement of this sustained rise in stock exchange prices, to-wit: Five years and nine months after the initial stock crash, they registered the start of the sustained rapid advance in the prices of pig iron which was the beginning of the recovery in the two former depressions, and in this depression (in which throughout steel prices were stabilized at a high level), the start of the sustained increase in the production of steel ingots making the beginning of recovery.

3. "That at some time in these depressions thus charted and measured —approximately at the same time— mass confidence was restored quite suddenly just as at their beginning it was destroyed.

4. "That mass confidence in a major depression, once regained, is not subject to frequent oscillations as has been generally claimed currently by unquiet minds, but thus regained, its continued existence, unless interrupted by war or similar elemental mass action, thereafter brings about a natural course of recovery in a definite time which is best measured, not from conjectural and varying estimates as to when confidence was regained, but from the initial stock crash or panic which demonstrated the existence of its general loss.

5. "That the sudden loss of mass confidence should be considered the specific cause of the following extreme dislocation of normal general business and credit functioning."

Elaborating on his fourth point, General Dawes stated that opinions as to the immediate effect on mass confidence of various governmental acts or policies should be taken with due allowance.

In this connection he pointed out that gold policies in 1873 and 1929 were diametrically opposite, while that of 1893 was contrary to those of both other depressions, but that none accelerated or retarded a natural course of recovery.

"Let me say here that the above does not relate to the longer-time effects of governmental policy in creating, or destroying mass confidence," he added.

"A present menace confronts a restored confidence and prosperity of the American people in the governmental budgetary deficit created largely by the expenditure of borrowed money. If this government does not gain better control of its budget and its eventual balancing becomes in the public mind a matter of continually increasing doubt, it will have created a condition which never in history has failed in time to cause a mass movement of the people inspired by fear and followed by prolonged business depression and social distress."

Duration Only Variable

General Dawes regards major panics as being essentially the same in nature and length, but that once ended and mass confidence regained, the duration of the following depression depends on whether the general business and credit structure was sound or unsound at the time the panic or crisis in mass fear occurred.

"The correspondence in time in the intervals between the sudden credit and stock collapse, marking the beginning of these three charted major depressions, and the beginning of the recovery year in each of them, cannot be accidental," he said. "Even if the natural reason for it was not simple and plain, the fact itself would imply a fundamental and a common cause.

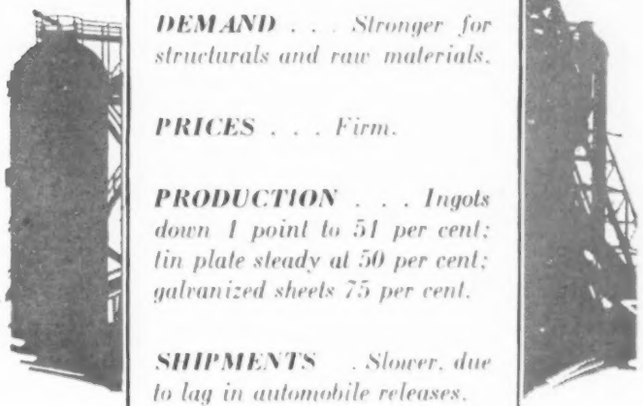
"The general criticism of my argument with its factual base, made nearly a year ago, was, of course, that the conditions, world and domestic, political and trade, social and governmental, especially those relating to governmental interference with natural laws of trade, were 'so different' in this major depression that what happened in other depressions was no criterion of what might happen in this. That is true in part, but only in part.

"What has led some of our current business commentators astray both in their prognostications and criticisms based on these 'differences,' is the error of assuming that mass attitudes and movements primarily have their source in human reasonings, rather than in human nature."

Massey-Harris Co. and the Doehler Die Casting Co. in Batavia, N. Y., have increased their operations and now have the largest working personnel in many months.

Shapes, Pig Iron, Strong Features; Rate at 51

Turning Point Comes in Auto Output; Ore, Steel 16% Ahead of 1934



MARKET IN TABLOID

DEMAND . . . *Stronger for structurals and raw materials.*

PRICES . . . *Firm.*

PRODUCTION . . . *Ingots down 1 point to 51 per cent; tin plate steady at 50 per cent; galvanized sheets 75 per cent.*

SHIPMENTS . *Slower, due to lag in automobile releases.*

WITH a substantial gain in structural steel awards to the largest volume since June, and heavy commitments for pig iron for fourth quarter, elements of strength persisted in the markets last week, notwithstanding a further loss of 1 point to 51 per cent in the steelworks rate.

The automobile industry apparently now holds the key to the steel operating situation, and a barrier to the upward trend is expected to be removed within a few days when it releases material. Probably the low point of the year in automobile production has been passed, output last week at 16,000 showing a moderate increase. By the end of this week most automobile manufacturers will be assembling 1936 models.

Beginning the fourth quarter, steelmakers are convinced that the year's most promising period is just ahead. September averaged about 52 per cent, practically on a parity with February, and also highest since that month. The more stable conditions this year are indicated by the fact that in between these two peaks, the steel rate has not fluctuated more than 12 points. Actual ingot tonnage for the month, when official figures become available this week, will show that the year's total to Oct. 1 has been raised to about 16 per cent over the comparable period in 1934.

That the industry is moving forward basically also is manifest in the rise of iron ore shipments in September to 4,900,000 tons, this, too, bringing the ore total to Oct. 1 to 16 per cent higher than last year.

Demand for raw materials constitutes a dominant note in the markets. Cleveland sellers booked 30,000 tons of pig iron last week. A Pittsburgh steel interest is reported to have entered 10,000 tons of basic iron for an Ohio manufacturer. A Buffalo stack has resumed, and more eastern and southern furnaces are scheduled to go in early this month. Coke displays a strong undertone. Scrap is firm, but shipments are a little slower.

Featuring structural awards of 28,550 tons are 7500 tons for the St. Louis postoffice, and 4000 tons for waterfront improvements at Miami, Fla. Fabricators are figuring 5000 tons for Chevrolet's commercial body plant at Indianapolis. The navy takes bids Oct. 15 on 5000 tons of steel for a cruiser and several submarines.

In the lighter products, Ford is reported to have placed 10,000 tons of his special type of "breakdown" sheets with a Baltimore producer for fabricating into autobodies by the E. G. Budd Mfg. Co. Sellers of alloy steel sheets report Chicago, Burlington Quincy has ordered two streamlined trains, six cars each, from the Budd company.

Chesapeake & Ohio's award of 21,800 tons of rails is expected momentarily, with at least 60 per cent to Carnegie Steel Co. Cerro de Pasco Copper Co. is inquiring for 30 hopper cars for South America.

"War" influences figure more conspicuously. Higher insurance rates have slackened scrap exports and ferroalloy imports. Pacific coast scrap dealers expect this to operate as a stimulus to scrap shipments to Japan. Tin plate makers are delaying price announcements fearful that war would lead to still higher lead prices. In Europe, STEEL's London editor notes a decided decline in interchange of iron and steel between the countries which might become affected.

Increases in steelworks operations last week were: Buffalo, 10 points to 47 per cent; Birmingham 5½ to 55½. Reductions: Wheeling 3 to 81; Chicago ½-point to 59; New England 13 to 55. Unchanged: Youngstown at 54; Pittsburgh 46; Cleveland 67; eastern Pennsylvania 35½; Detroit 94.

STEEL's iron and steel price composite is up 1 cent to $32.84; finished steel index holds at $53.70, and scrap $12.79.

COMPOSITE MARKET AVERAGES

	Sept. 28	Sept. 21	Sept. 14	One Month Ago Aug., 1935	Three Months Ago June, 1935	One Year Ago Sept., 1934	Five Years Ago Sept., 1930
Iron and Steel	$32.84	$32.83	$32.81	$32.68	$32.42	$32.15	$32.76
Finished Steel	53.70	53.70	53.70	54.02	54.00	54.00	50.87
Steelworks Scrap	12.79	12.79	12.62	12.05	10.45	9.45	12.81

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Sept. 28, 1935	Aug. 1935	June 1935	Sept. 1934
Steel bars, Pittsburgh	1.85c	1.80	1.80	1.80
Steel bars, Chicago	1.85	1.85	1.85	1.85
Steel bars, Philadelphia	2.11	2.11	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.40	2.55	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	Sept. 28, 1935	Aug. 1935	June 1935	Sept. 1934
Bessemer, del. Pittsburgh	$19.81	$19.81	$19.81	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.81	19.76
No. 2 foundry, del. Pittsburgh	19.31	19.31	19.31	19.26
No. 2, foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.68	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.25	24.25	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	18.67	18.67	18.67	18.88

Scrap

Heavy melting steel, Pittsburgh	$13.75	$13.25	$12.25	$10.75
Heavy melt. steel, No. 2, east. Pa.	11.25	10.50	9.30	8.00
Heavy melting steel, Chicago	12.50	12.35	10.25	8.65
Rails for rolling, Chicago	14.00	13.65	11.25	10.05
Railroad steel specialties, Chicago	13.75	13.55	11.75	9.80

Coke

Connellsville, furnace, ovens	$3.25	$3.25	$3.50	$3.60
Connellsville, foundry, ovens	4.00	4.00	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight carloads; less than straight carloads take trade quantity extras; 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$58.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20
4100	0.15 to 0.25 Mo		0.50
4600	0.20 to 0.30 Mo. 1.25-1.75 Ni.		1.05
5100	0.80-1.10 Cr		0.45
5100	Cr. spring		base
6100	bars		1.20
6100	spring		0.70
Cr., Ni., Van.			1.50
Carbon Van.			0.95
9250	Carbon base plus extras		

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23¾-in.

Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	75 off
Rolled thread, ½ x 6, smaller	75 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	75 off
Tire bolts	60 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	75 off
Step bolts	70 off
Elevator bolts	70 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	75 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less, Chicago del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935 card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B. Stnd. fitgs., Birm. base, $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.25- 3.40
Connellsville, fdry.	4.00
Connell. prem. fdry.	5.00- 5.35
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.00
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol		15.00c
Toluol		30.00c
Solvent naphtha		30.00c
Commercial xylol		30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	20.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40,	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10,	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus $1.21	67c, 81c and switching	charges	
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50,	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	Do., del. Chicago	24.25
Pitts. dist. fur.	18.00	Lake Superior fur.	21.00
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$55.00

First Quality

Pa., Ill., Md., Mo.	$45.00
Alabama, Ga.,Ky.,	$40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo.	40.00
Ga., Ala.	35.00

Ohio

First quality	$40.00
Intermediary	37.00
Second quality	28.00

Malleable Bung Brick

All bases	50.00

Silica Brick

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$45.00
Chemically bonded chrome brick	45.00
Magnesite brick	65.00
Chemically bonded magnesite brick	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$14.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsb'gh	90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†	26.00
Do., New Orleans	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent Spot, $5 a ton higher.	126-130.00
Silicoman., 2½ carb.	90.00
2% carbon, 95.00; 1%,	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.00
Ferrotungsten, stand., lb. con. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York N. Y.	Lead: East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Sept. 21	9.00	9.12½	8.60	49.00	48.50	4.50	4.35	4.75	*19.00	13.75	35.00
Sept. 23	9.00	9.12½	8.60	48.75	48.30	4.50	4.35	4.75	*19.00	13.75	35.00
Sept. 24	9.00	9.12½	8.60	48.85	48.50	4.50	4.35	4.75	*19.00	14.50	35.00
Sept. 25	9.00	9.12½	8.60	49.40	48.85	4.50	4.35	4.75	*19.00	14.50	35.00
Sept. 26	9.00	9.12½	8.60	49.65	49.00	4.50	4.35	4.75	*19.00	14.50	35.00
Sept. 27	9.00	9.12½	8.60	49.85	49.10	4.50	4.35	4.75	*19.00	14.50	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.37½
Copper hot rolled	16.00
Lead cut to jobbers	8.25
Zinc, 100-lb. base	9.50
Tubes	
High yellow brass	16.37½
Seamless copper	16.50
Rods	
High yellow brass	12.87½
Copper, hot rolled	13.25
Anodes	
Copper untrimmed	13.75
Wire	
Yellow brass (high)	14.87½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	5.75- 6.00
Cleveland	5.75- 6.00
Chicago	5.62½-5.87½
*St. Louis	5.75- 6.00
Heavy Copper and Wire	
New York, No. 1	6.75- 7.00
*Chicago, No. 1	6.87½-7.12½
Cleveland	6.50- 6.75
*St. Louis, No. 1	7.00- 7.25
Composition Brass Borings	
*New York	5.50- 5.75
Light Copper	
*New York	5.75- 6.00
Chicago	5.12½-5.37½
Cleveland	5.50- 5.75
*St. Louis	5.75- 6.00
Light Brass	
Chicago	3.12½-3.37½
Cleveland	3.00- 3.25
*St. Louis	3.50- 3.75
Lead	
*New York	3.50- 3.87½
Cleveland	3.25- 3.50
Chicago	3.25- 3.50
*St. Louis	3.60- 3.75
Zinc	
New York	2.50- 2.75
Cleveland	2.50- 2.75
*St. Louis	2.75- 3.00
Aluminum	
Borings, Cleveland	8.50- 9.00
Mixed, cast, Cleve.	13.25-13.50
*Mixed, cast, St. L.	13.00-13.50
Clips, soft, Cleve.	14.75-15.00

SECONDARY METALS

Brass ingot, 85-5-5-5	9.00
Stand. No. 12 alum.	16.50-17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.50
Boston, dock, expt.	9.50- 9.75
Boston, domestic	7.50- 7.75
Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	10.50-11.00
Chicago, No. 1	12.25-12.75
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	12.00-12.50
Eastern Pa., No. 2	11.00-11.50
Federal, Ill.	9.25- 9.75
Granite City, R. R.	9.50-10.00
Granite City, No. 2	8.00- 9.00
N. Y., deal, No. 2	7.50- 7.75
N. Y., deal, barge	8.50- 8.75
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)	13.50-14.00
Pittsburgh, No. 2	12.25-12.75
St. Louis	8.00- 8.50
Valleys, No. 1	13.00-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.50-11.00
Chicago, factory	11.50-12.00
Chicago, dealer	10.25-10.75
Cleveland	11.50-12.00
Detroit	10.25-10.75
E. Pa., new mat.	11.50-12.00
Pittsburgh	13.50-14.00
St. Louis	6.25- 6.75
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	8.00- 8.50
Cincinnati, del.	7.50- 8.00
Cleveland	9.50-10.00
Pittsburgh	12.00-12.50
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	7.50- 8.00
Cincinnati	7.00- 7.50
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.25-14.75
Chicago (3 ft.)	14.00-14.50
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	13.00-13.50
Detroit	12.50-13.00
Pitts., open-hearth, 3 ft. and less	16.50-17.00
St. Louis, 2 ft. & less	13.00-13.50

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	12.25-12.75
Pittsburgh	14.75-15.25
St. Louis	11.25-11.75
Buffalo	11.75-12.25

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	3.50- 3.75
Buffalo	10.25-10.75
Chicago	8.00- 8.50
Cincinnati, dealers	7.00- 7.50
Detroit, net	7.00- 7.50
Eastern Pa.	9.50
N. Y., deal, fdry.	6.00
St. Louis	8.00- 8.50

COUPLERS, SPRINGS

Buffalo	13.50-14.00
Chicago, springs	13.50-14.00
Eastern Pa.	14.50-15.00
Pittsburgh	16.50-17.00
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	14.00-14.50
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, billet and bloom crops	13.75-14.25
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.50-16.00
Pittsburgh, billet, bloom crops	16.75-17.25
Pittsburgh, sheet bar crops	16.00-16.50

FROGS, SWITCHES

Chicago	12.25-12.75
St. Louis, cut	11.25-11.75

SHOVELING STEEL

Chicago	12.25-12.75
Federal, Ill.	9.15- 9.50
Granite City, Ill.	8.00- 8.50

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.50-11.00
Buffalo, No. 2	12.00-12.50
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	12.25-12.75
Cincinnati, No. 2	9.50-10.00
Eastern Pa.	12.00-12.50
N. Y., No. 1, deal	9.50-10.00
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	9.25- 9.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	10.00
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.50-11.00
Chicago, No. 1	11.00-11.50
Cinci., No. 1, deal	7.50- 8.00
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	9.00- 9.50
Valleys, new, No. 1	12.25-12.75

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Chicago	6.50- 7.00
Cincinnati, dealers	5.50- 6.00
Cleveland	7.75- 8.25
Detroit	5.50- 6.00
Eastern Pa.	7.50- 8.00
New York, dealers	3.75- 4.00
Pittsburgh	9.75-10.25
St. Louis	2.25- 2.75
Valleys	8.50- 9.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.00- 7.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	6.50- 7.00
Eastern Pa.	6.00- 6.25
New York, dealers	1.50- 1.75
Pittsburgh	7.50- 8.50

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.00- 7.50
Chicago	6.00- 6.50
Cincinnati, dealers	5.00- 5.50
Cleveland	8.00- 8.50
Detroit	6.00- 6.50
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	3.00- 3.50

PIPE AND FLUES

Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	5.50- 6.00
Eastern Pa.	9.00- 9.50
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	5.75- 6.00
Buffalo	10.50-11.00
Cleveland	10.00-10.50
Detroit	8.50- 9.00
Pittsburgh	12.00-12.50

FORGE SCRAP

Boston, dealers	4.50
Chicago, heavy	13.50-14.00
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Cleveland	8.00- 8.50
Eastern Pa.	11.00
St. Louis	7.50- 8.00

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.50-11.00
Buffalo	14.00-14.50
Chicago, net	14.75-15.25
Eastern Pa.	17.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship point.	12.75-13.00
Eastern Pa.	18.50
New York, dealers	13.25-13.50
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal	6.00- 6.25
Buffalo, iron	11.00-11.50
Buffalo, steel	14.00-14.50
Chicago, iron	12.50-13.00
Chicago, rolled steel	13.50-14.00
Cincinnati, iron	10.00-10.50
Eastern Pa., iron	12.50-13.00
Eastern Pa., steel	14.50-15.00
Pittsburgh, iron	14.25-14.75
Pittsburgh, steel	16.50-17.00
St. Louis, iron	9.75-10.25
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	8.00- 8.25
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	11.75-12.25
Buffalo, mach.	12.50-13.00
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach. net	11.50-12.00
Chicago, railr'd net	10.00-11.00
Cinci., mach. cup	10.00-10.50
Cleveland, cupola	12.25-12.75
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	14.00-14.50
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	9.50-10.00
St. L., No. 1 mach.	11.50-12.00

HEAVY CAST

Boston, del.	6.00- 6.25
Buffalo, break.	10.50-11.00
Cleveland, break	10.00
Detroit, No. 1, mach. net	12.00-12.50
Detroit, break.	8.50- 9.00
Detroit, auto net	11.50-12.00
Eastern Pa.	11.00-11.50
N. Y., break. deal	6.75- 7.25
Pittsburgh	13.00-13.50

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.75-14.25
Chicago, R. R.	14.50-15.00
Cincinnati, agri. del.	11.00-11.50
Cleveland, rail	15.50-16.00
Detroit, auto net	12.50-13.00
St. Louis, R. R.	12.50-13.00
Eastern Pa., R. R.	12.00-12.50

RAILS FOR ROLLING

5 feet and over

Birmingham	11.00-11.50
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	13.75-14.25
Eastern Pa.	13.00-14.00
New York, dealer	10.50-11.00
St. Louis	12.00-12.50

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	13.75-14.25
Chicago	14.50-15.00
Eastern Pa.	15.00-16.00
Pittsburgh (heavy)	16.00-16.50
Pittsburgh (light)	15.00-15.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00-10.50
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.00

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.95c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.17c
Cleveland	2.95c
Detroit	3.04c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.26c
Pittsburgh (h)	2.90c
Philadelphia*	2.93c
Portland	3.60c
San Francisco	3.45c
Seattle	3.60c
St. Louis	3.20c
St. Paul	3.20c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.17c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.45c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
PLATES	
Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65 c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4 07c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.30c
Pitts** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c
BANDS	
Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Ch'cago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York(d)	3.56c
Philadelphia	3 18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh(h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c
COLD FIN. STEEL	
Baltimore (c)	3.58c
Boston	3.75c-3.90c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang.(f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c-4.31c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran.(f) (d)	5.95c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.87c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.44c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-5
Milwaukee	70
Pittsburgh	70-10-5

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Sept. 26

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.44 3 2 6	$13.99	1 15 0
Basic bessemer	15.44 3 2 6*	12.91	1 12 0
Hematite, Phos. .03-.05	16.06 3 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$27.17 5 10 0	$18.98	2 7 0
Wire rods, No. 5 gage	41.99 8 10 0	36.38	4 10 0
FINISHED STEEL			
Standard rails	$38.29 7 15 0	$36.34	5 10 0
Merchant bars	1.66c 7 10 0	1 14c to 1 19c	3 2 6 to 3 5 0
Structural shapes	1.63c 7 7 6	1 12c	3 1 6
Plates, †¼ in. or 5 mm.	1.77c 8 0 0	1 54c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.04c 9 5 0	2 12c	5 16 0††
Sheets, gal., 24 gage, corr.	2.44c 11 5 0	3 19c	8 15 0
Bands and strips	1.88c 8 10 0	1 45c	4 0 0
Plain wire, base	2.04c 9 5 0	1 85c	5 7 6
Galvanized wire, base	2.38c 10 15 0	2 28c to 2 32c	6 5 6 to 6 7 6
Wire nails, base	2.65c 12 0 0	2 30c	5 15 0
Tin plate, box 108 lbs.	$ 4.45 0 18 0	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	£16 6 7	6(a)	$17.16	260	$12.51	370	$25.31 63
Basic bessemer pig iron	17 2 9	3 10 0*	12.54	190	11.15	330	22.96 (b) 69.50
Furnace coke	4 0 8	0 16 6	6.27	95	3.89	115	7.64 19
Billets	27 1 7	5 10 0	28.38	430	18.25	540	38.85 96.50
Standard rails	1 8 2c	8 5 0	2.08c	694	1.65c	1,100	2.42c 132
Merchant bars	1 9 0c	8 12 0	1.68c	560	90c	600	2.01c 110
Structural shapes	1 9 3c	8 15 0	1.65c	550	90c	600	1.97c 107.50
Plates, †¼-in. or 5 mm.	2 0 0c	9 1 5	2.10c	700	1.05c	700	2.32c 127
Sheets, black	2 4 5c	11 0 0§	1.86c	620‡	1.24c	825‡	2.64c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2 8 7c	13 0 0	3.45c	1,150	2.25c	1,500	6.77c 370
Plain wire	2 0 4c	9 5 0	3.15c	1,050	1.73c	1,150	3.17c 173
Bands and strips	2 0 7c	9 7 0	1.95c	650	1.26c	840	2.32c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 64.70 per cent over paper sterling.

Bars

Bar Prices, Page 52

Pittsburgh—Producers are awaiting the test of application on their revised method of quoting carbon bar quantity extras. This goes into effect Oct. 1, and names 5 to 25-ton lots for shipment at one time as base, a price on which at Pittsburgh is 1.85c. No such similar change has been taken in alloy bars, remaining at a base of 2.45c, Pittsburgh. Bar demand is more active, representing chiefly the requirements of the automobile trade.

Cleveland — While the general volume of bar orders in September was larger than in August, a decline was noted in the past few days, although this situation is expected to right itself when automobile manufacturers get busier on new models. Some bar orders were received from forgers who are anticipating automobile releases. The railroads have not been buying extensively for their shops, though the quantity differentials which go in effect Oct. 1 in many instances will raise prices to them $2 a ton. Bolt and nut manufacturers, hardware and tool makers have figured in the market to some extent. The Cleveland mill operated at 50 per cent last week. Sales by Corrigan, McKinney Steel Co. now are billed through Republic Steel Corp.

Chicago—Individual bar orders are moderately larger, this tendency being a reflection of the new quantity differentials and extras. Total sales and specifications are fairly steady, with demand from the automotive industry gradually increasing. Automotive requirements still have not reached the volume anticipated for October. The movement of forging material continues active. No slackening is apparent in needs of the farm implement industry, while business from miscellaneous consumers is holding well. Prices are steady but little contracting for the entire fourth quarter is being done.

Boston—Forging and alloy bars are slightly more active, notably the former. Small tool makers and bolt and nut producers are busier, while alloy bars are moving freely to machine tool builders. Several normally large consumers, including railroads, are buying in restricted volume, but a well sustained and widespread miscellaneous demand for specialty material will bring the aggregate tonnage this month above last. Considerable contracting for fourth quarter has been done at third quarter prices, 1.80c, Pittsburgh, and the new price schedule is not generally applicable.

New York—While there has been some covering here of fourth quarter bar tonnage at third quarter schedules, the situation in this respect appears to have steadied, with leading sellers generally now adhering to the new quantity extras and deductions.

Philadelphia—New quantity extras and deductions on bars, effective tomorrow, are being generally quoted by producers, with the immediate outlook for a reduction in tonnage, as there has been some fair anticipatory buying by the smaller buyers who consume the great bulk of the tonnage in this district. Most jobbers and cold finishers now express themselves as fairly well satisfied with the new schedules. Effective on shipments after Sept. 30, the base on commercial steel bars, covering quantities from 5 tons to under 25 tons, will be 1.85c, Pittsburgh, or 2.16c, Philadelphia.

Seattle—Announcement of an advance of $1 Oct. 1 on plain carbon steel bars has not stimulated demand, volume of sales continuing about the same as heretofore.

Plates

Plate Prices, Page 52

Pittsburgh—Morris Knowles & Co., Westinghouse building, Pittsburgh, closed bids Sept. 25 on a 500,000-gallon elevated water tank for State College, Pa., which involves about 200 tons of plates. The barge market is quiet, but three Pittsburgh district yards are fabricating orders which, by the time they are completed, will involve between 12,000 and 13,000 tons of plates. American Bridge Co. will repair a number of Carnegie Steel Co. barges, involving several hundred tons of plates.

Cleveland — Gulf Refining Co., Pittsburgh, has announced it will build 12 gasoline storage tanks at Erie, Pa., with a total capacity for 4,000,000 gallons, and which fabricators figure will require 1000 tons of plates. Some substantial lots of plates have been placed for repairing Great Lakes vessels. The general market is rather quieter than earlier in the month.

Chicago—Plate specifications for structural purposes are heavier as a result of recent gains in orders for fabricated material. Miscellaneous sources are taking moderate tonnages, but requirements of railroads and equipment builders continue light.

Boston—Small orders for miscellaneous needs feature plate demand, the aggregate volume of such business being well sustained. There is some increased demand in heavier industrial equipment requirements. Boiler shops, still lacking backlogs, are nevertheless doing more spot business and ordering frequently. Close to 2000 tons of plates, held up for about two years, for an oil storage plant at Chelsea, Mass., is about to be released.

New York—Plate tonnage awarded in this district is confined to small lots, most sellers reporting a decline for September. Some substantial oil refinery business is in sight for October, it is reported. Consumers who have contracted have not asked for larger tonnages than specified for third quarter.

Philadelphia—Plate buying continues spotty, with specifications this month lighter than last, according to some leading sellers. This is reflected also in reduced ingot production at some of the eastern plate mills. No definite announcement has yet been made as to whether New York Shipbuilding Co. will submit bids on the light cruiser, up this week and involving 6500 tons of steel. The company originally had prepared estimates in expectation of bidding when this boat first came up early in August, but did not submit them. Railroad requirements are light. Edward G. Budd Mfg. Co. is reported to have received the formal contracts for building two more streamlined trains for the Chicago, Burlington & Quincy, for which some special plates will be required. Tank work is unusually light. Prices are unchanged at 1.90c, Coatesville, Pa., or 1.99½c, Philadelphia.

Washington—Navy department will receive bids Oct. 15 for 5000 tons of plates, shapes and bars for one new cruiser and for several submarines. A new clause has been inserted in contracts whereby after a period of six months either the department or the steel contractor can terminate the contract after a notice of 60 days. It is believed this condition was brought about through the recent Nye munitions committee investigation.

Youngstown, O. — Petroleum Iron Works, near Sharon, Pa., has booked an order for 40 tank cars, requiring 225 tons, from the Standard Oil Co. of Kansas, Wichita, Kans. New steel plate business booked here by the mills consists largely of miscellaneous scattered lots.

San Francisco—The largest plate letting on the Pacific coast, 500 tons for water stops for the metropolitan water district, Los Angeles, went to Consolidated Steel Corp., Los Angeles. Pending business is confined to unimportant projects with the exception of a welded steel pipe line for the East bay municipal utility district, Oakland, Calif. Steel Pipe & Tank Co., Berkeley, Calif., is low bidder on this 1700-ton project.

Seattle—To legalize a proposed

$175,000 bond issue to finance a steel pipe water main extension, Everett, Wash., held a special election last week. The job calls for 14,525 feet of 36-inch and 5195 feet of 24-inch steel pipe, totaling about 1000 tons. It is expected this work will proceed without further delay and bids are likely to be taken soon. Bureau of Roads, Portland, Oreg., will ask bids soon for the Tooth Rock tunnel, near the Bonneville, Oreg., project. The bore will be semicircular, 800 feet long, and 34 feet wide, estimated to cost $150,000.

Contracts Placed

500 tons, specification 119, water stops for metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.

400 tons, 28-inch i. d. land pipe, ½-inch wall, United States engineer, Kansas City, Mo., to McClintic-Marshall Corp., Bethlehem, Pa.

125 tons, tank, Gulf Refining Co., Evansville, Ind., to Graver Tank & Mfg. Corp., East Chicago, Ind.

100 tons, schedule 3080, Panama Canal, to unnamed interest.

Contracts Pending

1760 tons, 20 and 24-inch welded steel pipe, East bay municipal utility district, Oakland, Calif.; Steel Tank & Pipe Co., Berkeley, Calif., low.

1000 tons, 12 gasoline storage tanks at Erie, Pa., for Gulf Refining Co., Pittsburgh.

200 tons, 500,000-gallon elevated water tank, State College, Pa.; Morris Knowles & Co., Westinghouse building, Pittsburgh, engineer; bids closed Sept. 25.

Transportation

Track Material Prices, Page 53

Edward G. Budd Mfg. Co., Philadelphia, is reliably reported to have received contracts for the construction of two additional light-weight steel high-speed streamlined trains for the Chicago, Burlington & Quincy. Unlike trains of this type previously ordered from the Budd company by the Burlington, the new trains will have six cars each instead of three, it is said.

New rail inquiries from western roads are lacking, the leading pending tonnage being 21,800 tons for the Chesapeake & Ohio. The Santa Fe is expected to purchase some additional track material in connection with an extensive program of curve straightening and other track work for which several million dollars will be spent.

Cerro de Pasco Copper Co. is inquiring for 30 hopper cars, 40-ton capacity, for export to South America.

The Santa Fe is rebuilding 150 refrigerator cars in its own shops. Norfolk & Western will build 10 all-steel covered hopper cars and two mallet-type freight locomotives in its shops at Roanoke, Va.

Approximately 60 per cent, or 13,026 tons, of the 21,710-ton rail inquiry of Chesapeake & Ohio is to be awarded to Carnegie Steel Co., Pittsburgh. Norfolk & Western soon will award 10,000 tons of 131-pound rails; otherwise prospective inquiry is absent.

Norfolk & Western will soon issue inquiries for steel and other material requirements to build five hundred 57½-ton hopper cars in its own shops.

Car Orders Placed

225 tons, 40 tank cars for Standard Oil Co. of Kansas, Wichita, Kans., to be built by Petroleum Iron Works, Sharon, Pa.

Louisville-San Francisco, two lounge cars, own shops.

Norfolk & Western, 10 all-steel covered hopper cars, 50-ton capacity, own shops, Roanoke, Va.

Standard Oil Co. of Kansas, Wichita, Kans., 40 tank cars, to Petroleum Iron Works, Sharon, Pa.

Locomotives Placed

Norfolk & Western, two mallet-type locomotives, own shops, Roanoke, Va.

United Fruit Co., Boston, one locomotive of 2-8-2 type, to Baldwin Locomotive Works, Eddystone, Pa., for export to Cuba.

Car Orders Pending

Cerro de Pasco Copper Co., 30 hopper cars, 40-ton capacity, for South America.

Buses Booked

Twin Coach Corp., Kent, O.; Eight 23-passenger for Steubenville, East Liverpool & Beaver Valley Traction Co., East Liverpool, O.; four 31-passenger for Washington Rapid Transit Co., Washington; six 23-passenger for Northern Texas Traction Co., Fort Worth, Tex.; three 23-passenger for Northern Indiana Railway Co., South Bend, Ind.; four 23-passenger for Canton Motor Coach Co., Canton, O.; four 41-passenger for Los Angeles Railway Corp., Los Angeles; one 23-passenger for Southwest Missouri Railroad Co., Joplin, Mo.; seventeen 37-passenger for Kansas City Public Service Co., Kansas City, Mo.; fifteen 23-passenger for Capital Transit Co., Washington; two 23-passenger for New York State Railways, Utica, N. Y.

Semifinished

Semifinished Prices, Page 53

Attractive sheet bar buying is noted for production of galvanized sheets. Galvanized sheet mills are running at about 75 per cent, indicating a strong demand for rural and industrial repairs and rehabilitation. Tin plate mills are running at 50 per cent, and are losing their place as a semifinished steel outlet. An unchanged volume of business is reported covering wire rods, skelp, tube rounds, and re-rolling billets. Sharing the sheet bar improvement is that of forging quality billets, where a price advance will go in effect Oct. 2.

Sheets

Sheet Prices, Page 52

Pittsburgh—Sheet buying has diminished slightly, but the difference between producers' bookings in September and October was less than 5 per cent. In the case of some sheet producers, backlogs are noticeably heavier as October commences, attributable to automotive buying. Galvanized sheet activity is the outstanding feature at present, and operations in this grade of sheets are at 75 per cent of capacity, which is a year's high. Full finished mills are at about 65 per cent, common black output at about 70 per cent, and jobbing mills, 50-55 per cent.

Cleveland—Sheetmakers are receiving some fairly good releases from automobile manufacturers, and appear confident of a gradually mounting demand, with substantial orders from this source over the next two months. In other lines, specifications are steady, or slightly better than earlier in September. Jobbers, barrel and stove manufacturers are taking more, while refrigerator interests are coming into the market shortly for material for new models. Sign fabicators report a slackening in their business. Sheet mill operations are intermittent, the local mills being near capacity, and those at Monroe, Mich., at 75 per cent last week.

Chicago—Sheets continue the most active of various steel products, with production around 75 to 80 per cent. Releases from automotive interests against old orders are slow to be received, due to the delays in starting production of new models, but this is regarded as only temporary and heavier shipments are in prospect for the next several weeks.

Boston—Industrial demand for sheets has improved. Small tank fabricators have approached the peak of activity on 275-gallon oil burner tanks, taking No. 12 and No. 14 gage blue annealed sheets, buying of which is active. Truck body builders have also increased specifications. Slightly heavier orders for galvanized by jobbers during the last two weeks has been due to buying in advance of the elimination of the $2 differential to warehouse distributors.

New York—Sheet tonnage is fairly well sustained here, with little forward buying but rather substantial

business of spot diversified character. Prices are unchanged.

Philadelphia—Leading sheet sellers report September business as on a parity with August. While lacking official confirmation, a report given considerable credence is that the Ford Motor Co. has placed 10,000 tons of its special type of break-down sheets with a Baltimore producer for fabrication by the Edward G. Budd Mfg. Co. into autobodies. Sellers of special alloy sheets are also interested in the report that the Chicago, Burlington & Quincy has placed formal contracts last week with the Budd company for two high-speed streamlined trains, each to be comprised of six cars instead of three such as comprised the trains previously placed by Burlington with this company.

Buffalo—Further gains are noted in sheet production, mills now operating at 75 per cent. Schedules indicate this level will be steady for fully 30 days.

Youngstown, O.—Sheet mill operations in this district continue to be maintained at satisfactory rates, specifications and new business coming from a wide variety of sources. As fast as one sheet-consuming industry passes into its seasonal dullness, another takes its place. Just now the industry is awaiting almost daily the expected influx of new business from the automotive builders.

Cincinnati—Rolling schedules of district sheet mills have been raised well above 70 per cent on steady specifying from miscellaneous sources and slowly increasing needs in the automotive field. Pressure for shipments remains a feature.

St. Louis—Prices and demand are steady, with indications of improved buying during October. The movement of corrugated roofing to the South is in considerable volume. Silo makers report the best season since 1929.

Birmingham, Ala.—Sheet mills are maintaining steady operations. Wholesale and jobbing interests are increasing stocks.

Seattle—Sheets are in good demand in this and the Portland, Oreg., district. Galvanized items lead the list, light gages moving actively, required for roof repairs and general construction jobs.

Cold Finished

Cold Finished Prices, Page 53

Pittsburgh—Buyers of carbon cold-finished steel bars who are now entering specifications for October shipment are being applied with the revised list of quantity extras. Since the time producers announced revised extras, which was late in August, buyers were able to enter specifications through September and for October shipment under the old setup. Now, those buyers which did not enter specifications in September will be applied with the revised extras even though they specify October shipment. In other words, by Nov. 1 the appliction of the new extras will have become general. Base prices on cold-drawn steel remain 1.95c for carbon and 2.95c for alloy quality. Automotive buying is still beneath expectations.

New York—In the main, cold finishers and jobbers appear fairly well satisfied with price schedules as they now stand. However, some jobbers are seeking establishment of higher extras on quantities of one ton or less.

Pipe

Pipe Prices, Page 53

Pittsburgh—Producers continue to quote discounts which are unchanged from former code levels; in fact, present discounts were last officially changed July 1, 1933, and no subsequent revision in standard butt or lap weld, line pipe, or boiler tubes has since been effected. Producers of new pipe in countless cases recently have been deprived of orders by the consistent policy of line pipe operators in using reclaimed material for extensions and repairs. However, it is pointed out that the eventual market for new pipe is thereby building up to significant proportions.

Chicago—Cast pipe orders continue light despite the large tonnage involved in pending work. Various reasons are given for the delay starting projects for which federal loan applications have been made, but it is expected that such work shortly will be speeded. New bids are to be taken on 400 tons for the Ann Arbor, Mich., sewage disposal plant.

Boston—Merchant steel pipe buying is slightly heavier, but in small lots. With cast pipe, such orders are more frequent, although tonnage continues to lag. Work relief projects are taking more material.

Youngstown, O.—Merchant pipe still furnishes the backbone of the new wrought pipe business coming to the mills here, which are operating fairly steadily. Two natural gas projects in and around Lansing and Grand Rapids, Mich., are arousing some line pipe expectations.

Seattle—Seattle has awarded 230 tons of cast pipe, 7000 feet of 12-inch, class 150 and 250. This material is for several local projects. Demand for cast pipe has not improved materially although it is expected funds soon will be available for numerous proposed municipal projects.

San Francisco—Cast iron pipe awards for the week were the largest in over three months with 2923 tons placed, bringing the aggregate for the year to 27,337 tons as compared with 30,630 tons for the corresponding period in 1934. Pending business is confined to lots of less than 100 tons, and little new work is in sight at present.

Cast Pipe Placed

1995 tons, 6 and 8-inch, San Francisco, to United States Pipe & Foundry Co., Burlington, N. J.

300 tons, 4 to 10-inch, Fresno, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

230 tons, 12-inch, class 150 and 250, Seattle, to United States Pipe & Foundry Co., Burlington, N. J.

225 tons, Victor, Idaho, to unnamed interest.

200 tons, 2 to 6-inch, Bloomington, Idaho, to unnamed interest.

Cast Pipe Pending

400 tons, sewage disposal plant, Ann Arbor, Mich.; new bids to be taken.

245 tons, extensions at Mabton, Wash.; bids to T. W. Howell, clerk, Oct. 7.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 53

Fourth quarter contracts for bolts and nuts are being received in fair number, with little opposition reported so far to the new 75 per cent discount. Although this market has not been thoroughly tested, sellers are hopeful that introduction of the new price will end the instability which has been common in bolt and nut quotations so far this year.

Specifications for bolts, nuts and rivets at Chicago are fairly steady, though business so far this month shows little change from the August rate. Railroad purchases still are restricted. Jobbers catering to the automotive suppliers are taking larger lots, while requirements of farm implement manufacturers are well maintained.

At Pittsburgh a few small spot sales of carriage and machine bolts have been made at the 75 off list price but larger buyers still report their ability to get concessions. A large tonnage of rivets is beginning to shape up in the Pittsburgh district for the construction of 1500 Chesapeake & Ohio railroad cars at Butler, Pa. Inquiry from the Norfolk & Western for 500, 57½-ton box cars will indirectly involve a sizable tonnage of rivets. The market on small rivets continues 70-5 off list.

At $15,798, delivered, waterside, Miami, Fla., Pittsburgh Screw & Bolt Corp. has been awarded contract for bolts, nuts, tie rods and miscellaneous bulkhead hardware for a Miami harbor improvement.

Shapes

Structural Shape Prices, Page 52

New York—Bridge and subway requirements are slightly heavier, 3300 tons for the latter closing this week. Bridge contracts also are more numerous, although few such projects take large tonnages per unit. Awards are led by 2300 tons for the Bronx postoffice, Bethlehem Fabricators Inc., Bethlehem, Pa., to fabricate.

Considerable used and foreign steel is being used in small apartment and other limited-tonnage projects, including substantial quantities from dismantled buildings at the Chicago fair. Shipments by boat of this material last week amounted to 1300 tons, making a total of about 3500 tons, with more expected in the spring.

Production of fabricated structural steel during August was 40.5 per cent of normal, according to the American Institute of Steel Construction, New York. The operating rate was 40 per cent in July. August shipments were 49.1 per cent of normal, as against an average of 38.4 per cent for the eight months of this year.

Chicago—Awards again involve more than 10,000 tons, the total being swelled by 7500 tons for the St. Louis postoffice and 2819 tons of shapes and piling for Mississippi river lock No. 25. Orders for river locks and dams now have been practically completed, though the bulk of material remains to be fabricated and shipped. Good activity continues in building projects involving less than 100 tons.

Pittsburgh—American Bridge Co., Pitsburgh has booked 4000 tons of fabricated structural steel for dam No. 18, Mississippi river at Burlington, Iowa. S. A. Healy & Sons, Detroit, are general contractors for this job. Fabricators here are preparing estimates for 3300 tons for the West Fortieth-Forty-seventh street subway extension on Sixth avenue, New York. Many railroads have prepared estimates of grade crossing eliminations, but tonnage requirements are considerably less than first anticipated. Base price of 1.80c holds on plain structural shapes. Steel sheet piling is quoted 2.15c, base, Pittsburgh.

Cleveland—Chevrolet's commercial body plant, Indianapolis, will require 5000 tons of shapes, on which fabricators here are figuring. This is one of the largest industrial projects, outside of steelworks expansions, to have come out this year in the Middle West. Fabricators say many industrial buildings are as obsolete as the equipment, which in some instances now is being replaced, and look for developments in this direction. Erie railroad in conjunction with the state of New York is projecting several new bridges, and also has specifications of its own nearly ready, calling for grade eliminations, one requiring 300 tons. A few small awards are noted in this district.

Boston—Structural steel inquiry is tending upward, bridges placed or about to be closed requiring approximately 600 tons. Public works, including more small postoffices on which bids are in, also are more active.

Philadelphia—State bridge work is a feature of new construction, with three projects involving approximately 800 tons active. Several other fair-size projects also are pending, including the 2300-ton Archives building, Washington. Generally speaking, structural activity in this district is slow.

St. Louis—Business of structural steel fabricators has expanded substantially. Total orders for about 10,000 tons have been booked recently, and prospects are for additional awards of considerable size. Mississippi Valley Structural Steel Co., Decatur, Ill., has booked 7500 tons for the St. Louis postoffice superstructure. Stupp Bros. Bridge & Iron Co., St. Louis, was awarded 2120 tons for the Bridge of the Ozarks, a Missouri highway project.

Birmingham, Ala. — Numerous small contracts sustain fabricating shop activity in the Birmingham district. Shipments are heavy.

San Francisco—Structural shape awards totaled 1664 tons, bringing the aggregate to date to 82,154 tons, compared with 101,787 tons for the same period in 1934. Commercial Shearing & Stamping Co. booked 350 tons for tunnel ribs under specification 121 for the metropolitan water district, Los Angeles. Ben C. Gerwick was awarded contract requiring 3300 tons of sheet piling for the Government Island bulkhead, Oakland, Calif., and is expected to sublet the piling within a few days.

Shape Contracts Pending

7500 tons, postoffice, St. Louis, to Mississippi Valley Structural Steel Co., Decatur, Ill.

3370 tons, steel sheet piling, harbor improvement project, Miami, Fla., 2022 tons to Jones & Laughlin Steel Corp., Pittsburgh, $111,412.20; 674 tons to Inland Steel Co., Chicago, $37,137.40; 674 tons to Carnegie Steel Co., Pittsburgh, $37,137.40. Kalman Steel Corp., Bethlehem, Pa., awarded 230 tons used steel sheet piling at $12,673. Delivery to waterside, Miami.

2819 tons, lock No. 25, Cap au Gris, Mo.; 1751 tons of permanent piling to Inland Steel Co., Chicago, 1068 tons of shapes to Mississippi Valley Structural Steel Co., Decatur, Ill.

2120 tons, Bridge of the Ozarks, Missouri state highway project, to Stupp Bros. Bridge & Iron Co.

2300 tons, postoffice, Bronx, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.; Cauldwell-Wingate Co., New York, general contractor.

890 tons, trusses and beam spans, Louisa county, Iowa, to Clinton Bridge Works.

850 tons, plant building, Dearborn, Mich., for American Blower Corp., Detroit, to R. C. Mahon Co., Detroit. Previously noted to unstated buyer.

695 tons, state highway bridge, Cohansey river, Bridgeton, N. J., to Virginia Bridge & Iron Co., Roanoke, Va.; Merritt-Chapman & McLean Corp., Baltimore, general contractors.

660 tons, towers, specification 634 Boulder dam project, bureau of reclamation, Denver, Colo., to American Bridge Co., Pittsburgh.

610 tons, fabricated structural steel and miscellaneous bulkhead hardware, including bolts, nuts, tie rods, harbor improvement project, Miami, Fla., to Virginia Bridge & Iron Works, Birmingham, $29,660, and Pittsburgh Screw & Bolt Corp., Pittsburgh, $15,798. Delivery, waterside, Miami.

570 tons, four roller gates, All-American canal, bureau of reclamation, Nevada, to Dravo Construction Co., Pittsburgh.

350 tons, tunnel ribs, metrolopitan water district, Los Angeles, specification 121, to Commercial Shearing & Stamping Co., Youngstown, O.

340 tons, state bridge, Flathead county, Montana, to unnamed interest.

330 tons, state medical building, Jamestown, N. Dak., to McClintic-Marshall Corp., Bethlehem, Pa.

315 tons, highway bridge, Grangeville, Idaho, to Kansas City Structural Steel Co., Kansas City.

315 tons, unit No. 5, sewage plant, Washington, to Fort Pitt Bridge Works, Pittsburgh.

310 tons, alterations, International Furniture Co., Pittsburgh, Pa., to Levinson Steel Co., Pittsburgh.

300 tons, bridge, Bennett, Colo., to Virginia Bridge & Iron Co., Roanoke, Va.

300 tons, bridge, Medicine Lodge, Kans., to George C. Christopher & Son, Wichita, Kans.

290 tons, stage building No. 4, Vitaphone Corp., Brooklyn, N. Y., to Harris Structural Steel Co., New York; through G. A. Zimmerman Corp.

285 tons, warehouse, Philadelphia, to Belmont Iron Works, Philadelphia.

280 tons, building, American Oil Co., Pittsburgh, to Keystone Engineering Co., Pittsburgh.

260 tons, Washington Irving school, West Roxbury district, Boston, to Bethlehem Fabricators Inc., Bethlehem, Pa.; John Bowen & Co. Inc., Boston, general contractor.

250 tons, lock and dam No. 9, Allegheny river, Pennsylvania, to Independent Bridge Co., Indianapolis.

250 tons, bridge, Shelby, Mont., to Minneapolis-Moline Power Implement Co., Minneapolis.

Shape Awards Compared

	Tons
Week ended Sept. 28	**28,550**
Week ended Sept. 21	**18,522**
Week ended Sept. 14	**24,081**
This week, 1934	**14,044**
Weekly average, 1934	**16,284**
Weekly average, 1935	**15,860**
Weekly average, August	**18,336**
Total to date, 1934	**665,641**
Total to date, 1935	**634,400**

225 tons, buildings, Blue Plains sewage commission, District of Columbia, through John McShain, Philadelphia, to Fort Pitt Bridge Works, Pittsburgh.

225 tons, bridge, Paonia, Colo., to American Bridge Co., Pittsburgh.

200 tons, building, Budd Wheel Co., Detroit, to Acorn Iron Works, Detroit; previously reported as awarded to Acorn Iron & Metal Co. Inc., Atlantic City, N. J.

193 tons, shapes and bars, dormitory buildings, Algoa, Mo.; 127 tons, shapes, to St. Louis Structural Steel Co., East St. Louis, Ill.; 66 tons, bars, to Koenner Engineering Co., St. Louis; Simon Construction Co., Columbia, Mo., general contractor.

162 tons, state highway work in Larimer county, Colorado, to unnamed interest.

160 tons, factory addition, Valley Industries Inc., Sayre, Pa., to Seneca Engineering Co.

160 tons, building, for Atlantic Wire Co., Bancroft, Conn., to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, bridge, Byers, Colo., to Minneapolis-Moline Power Implement Co., Minneapolis.

150 tons, highway bridge, Otsego, N. Y., to American Bridge Co., Pittsburgh; through Connell & Laub, Dayton, O.

150 tons, bridge, Juniata river, Mapleton, Pa., to Belmont Iron Works, Pa.

150 tons, building, American Smelting & Refining Co., Garfield, Utah, to Kansas City Structural Steel Co., Kansas City, Mo.

135 tons, factory building, Ford Motor Co., Northville, Mich., to Whitehead & Kales, Detroit.

123 tons, crossing and bridge in Platte and Carbon counties, Wyoming, respectively, to unnamed interests.

120 tons, Lee creek bridge, Glacier Park, Montana, to American Bridge Co., Pittsburgh.

120 tons, Kinslee theater for Shaker-Lee Theater Co., Shaker Heights, O., to Fort Pitt Bridge Works, Pittsburgh.

110 tons, warehouse, East St. Louis, Ill., to Ingalls Iron Works, Birmingham.

106 tons, state bridge, Waskakie county, Wyoming, to unnamed interest.

102 tons, state highway work in Lincoln county, Colorado, to unnamed interest.

100 tons, state highway work in three counties in Colorado, to unnamed interests.

100 tons, digester building for Sound Pulp Co., Everett, Wash. to Issacson Iron Works, Seattle.

100 tons, bridge superstructure, Standish, Me., to Phoenix Bridge Co., Phoenixville, Pa.; bids direct to state highway commission, Augusta, Me., Sept. 24, $9912.85.

Unstated tonnage, 541-foot state bridge, Montana, to unnamed interest.

Unstated tonnage, gates and hoists, Pine View dam, Utah, and Rye Patch reclamation bureau dam, Nevada, to unnamed interests.

Shape Contracts Placed

5000 tons, Chevrolet commercial body plant, Indianapolis; bids Sept. 30.

5500 tons, Manhattan approach to Triboro bridge, New York, contract No. 48, closing Oct. 17.

3300 tons, sheet steel piling, bulkhead, Government Island, Oakland, Calif.; general contract to Ben C. Gerwick, San Francisco.

3000 tons, Franklin K. Lane high school, Brooklyn, N. Y.; bids Oct. 15.

1700 tons, including 1125 tons of piling, levee wall, Cairo, Ill.

900 tons, piling, outer drive bridge dock and approach, Chicago; steel abandoned in favor of wood piling.

900 tons, cranes, American Sheet & Tin Plate Co., Gary, Ind.

900 tons, shapes and bars, postoffice, custom and court house, Galveston, Tex.; Algernon Blair, Montgomery, Ala., low on general contract.

560 tons, dam, Pickwick Landing, Sheffield, Tenn., for Tennessee valley authority, Knoxville, Tenn.

500 tons, bridge, Southern Pacific railroad over Neuces river, Texas; bids in Sept. 26.

500 tons, also 35 tons of reinforcing bars, bridge for Sullivan county, Indiana, at Meron, Ind.

450 tons, bridge repairs and flooring for a state bridge in Louisburg borough, Pennsylvania, over the west branch of the Susquehanna, route 259; bids Oct. 4. Steel flooring will comprise 25,823 square feet, or approximately 350 tons.

400 tons, additions to buildings No. 11 and No. 12, navy yard, Brooklyn, N. Y.; Phoenix Bridge Co., Phoenixville, Pa., low on direct bid.

400 tons, Bonneville, Oreg., project powerhouse, superstructure; bids to United States engineer, Portland, Oct. 8.

350 tons, postoffice and court house, Tallahassee, Fla.; H. W. Beers Jr., Atlanta, Ga., low.

325 tons, state bridges, Texas.

317 tons, building, Automatic Reclosing Circuit Breaker Co., Columbus, O.

300 tons, parcel post building, Worcester, Mass.; Tremagalio Bros., Waterbury, Conn., low.

275 tons, substation, Norris dam, for Tennessee valley authority, Knoxville, Tenn.

225 tons, exhibition building, Dallas, Tex.

218 tons, state bridge between Clinton and Center counties, Pennsylvania, route 219; bids Oct. 4.

200 tons, postoffice, Chester, Pa., Nicholas Engineering Co., Philadelphia, low on general contract; approximately 125 tons of bars also required.

200 tons, state bridges, Iowa.

180 tons, state bridge, McKean county, Pennsylvania; bids opened Sept. 27.

125 tons, postoffice, Amsterdam, N. Y.; Ring Construction Co., Minneapolis, low.

100 tons, warehouse, Sherwin-Williams Co., at Bound Brook, N. J.

Unstated tonnage, assembly and storage building, Diamond T Motor Car Co., Chicago.

Reinforcing

Reinforcing Bar Prices, Page 53

New York — More than 11,000 tons of reinforcing steel is active, Randalls Island junction, Triboro bridge, closing Oct. 10, furnishing the largest inquiry, 5750 tons. Buying is much heavier, notably highway mesh, bridge and miscellaneous building requirements. Prices are under pressure of contractor-buyers.

Chicago — Reinforcing bar awards are heavier as a result of the placing of several large lots for public projects. For Mississippi river dam No. 18, 1250 tons have been placed, while 559 tons for lock No. 25 also have been awarded. Fair activity continues in private work, involving small tonnages.

Pittsburgh — A few of the eastern railroads have been compiling estimates of grade crossing elimination work. Most of the jobs are smaller than expected. Distributors' Pittsburgh base of 2.05c for new billet steel bars to be used for reinforcing purposes is firm.

Cleveland—Only small lots of reinforcing bars are being placed, both private and public work in this district requiring bar tonnages being slow. Two federal housing projects in Cleveland on which bids have been taken still are pending.

Philadelphia — Outstanding here are the award of 550 tons of reinforcing bars to Irwin & Leighton, this city, general contractor, for marine barracks at Quantico, Va., and the reported placing of 240 tons of rail steel bars by the Turner Construction Co., this city, for the marine terminal of the South Jersey Port commission, Camden, N. J. This latter tonnage is reported to have gone under 1.50c, base, and in general prices on reinforcing bars are unsettled.

Boston—The Mount Pleasant avenue school, Providence, R. I., closing Oct. 14, will take approximately 600 tons of reinforcing steel. Highway and bridge requirements are heavier. The extensive state highway sidewalk program in Massachusetts will take little reinforcing. Prices to consumers are easy.

San Francisco—Awards of reinforcing bars on the Pacific coast now are double the tonnage for the same period last year when 89,118 tons were booked. To date this year 179,811 tons have been placed. Following the recent heavy purchases for the metropolitan water district in Los Angeles, the movement has been confined to small lots. Bids will be opened Oct. 9 for 1100 tons for the San Pablo avenue undercrossing at the San Francisco-Oakland bridge.

Seattle—Demand for concrete bars is rather slack in Washington, but larger tonnages are pending in Oregon and Idaho. Local mills are moving only small lots and feel the lack

Concrete Awards Compared

	Tons
Week ended Sept. 28	**6,493**
Week ended Sept. 21	**14,648**
Week ended Sept. 14	**7,065**
This week, 1934	**2,162**
Weekly average, 1934	**4,084**
Weekly average, 1935	**6,676**
Weekly average, August	**3,829**
Total to date, 1934	**187,124**
Total to date, 1934	**267,451**

of active building construction. Unstated interests have taken 320 tons for the state bridge, Klamath river, Oregon.

Reinforcing Steel Awards

1250 tons, dam No. 18, Burlington, Iowa, to Illinois Steel Co., Chicago; S. A. Healy Co., Chicago, general contractor.

825 tons, sewage project, contracts Nos. 3, 4 and 5, Ward's Island, N. Y., to Kalman Steel Corp., Bethlehem, Pa.; through George H. Flinn Corp.

714 tons, Chicago sanitary district project No. 4, to Concrete Steel Co., Chicago.

400 tons, highway, Saratoga county, New York, to Kalman Steel Corp., Bethlehem, Pa.; through S. A. Scullen Inc., Cohoes, N. Y.

559 tons, lock No. 25, Cap au Gris, Mo., to Inland Steel Co., Chicago.

550 tons, marine barracks, Quantico, Va., through Irwin & Leighton, Philadelphia, to Concrete Steel Co., New York.

375 tons, highway, Union Square, Oswego county, New York, to American Steel & Wire Co., New York; through Rochester Concrete Construction Co. Inc.

325 tons, Fisher Body building of Chevrolet Motor Co., Tarrytown, N. Y., to Fireproof Products Co., New York; through White Construction Co.

320 tons, Klamath river, Oregon, state bridge, to unnamed interests; C. J. Montag & Son, Portland, general contractor.

250 tons, highway, Pine Bush-Elleville, Ulster county, New York, to Concrete Steel Co.; through West Shore Concrete Co. Inc., Tuxedo, N. Y.

240 tons, rail steel bars, port development, South Jersey port commission, Camden, N. J., through the Turner Engineering Co., Philadelphia, to an unnamed seller.

200 tons, highway, Alden-Darien Center-Alexander, Genessee county, New York, to Kalman Steel Corp., Bethlehem, Pa.; through Peter J. Knickenberg, Buffalo.

175 tons, Island Park reclamation project, Idaho, to unnamed interests.

170 tons, Uncompahgre canal, reclamation project, Wyoming, to unnamed interests.

140 tons, building, Pittsburgh Plate Glass Co., Newark, N. J., to Kalman Steel Corp., Bethlehem, Pa.; through United Engineers & Constructors Inc.

Reinforcing Steel Pending

1500 tons, Manhattan approach to Triboro bridge, New York, contract No. 48, bids closing Oct. 17. Project also includes 230,000 linear feet of reinforcing trusses, 115 tons of pipe, railings and miscellaneous in drainage system.

1100 tons, undercrossing, San Pablo avenue, Oakland, Calif., for San Francisco-Oakland bridge; bids Oct. 9.

150 tons, for delivery to Columbus, O., for FERA.

125 tons, postoffice, Chester, Pa., Nicholas Engineering Co., Philadelphia, low on the general contract; approximately 200 tons of structurals also required.

100 tons, two Washington state highway projects; general contracts awarded.

Unstated tonnage, railroad overpass, American Falls, Idaho; William Hoops, Twin Falls, Idaho, general contractor.

Behind the Scenes with STEEL

Gushing

REVERBERATIONS of approval assail our avid ears until we are almost convinced last week's Metal Show issue of STEEL was received with open arms by readers starved for editorial nourishment.

At the top of a pile of congratulatory letters we glimpse one from Bill Eisenman, Metal Congress No. 1-boy, who says, regarding the special issue, that "it again demonstrates that you have a splendid knowledge of the general setup of the National Metal Congress and that you have carried the issue forward in an excellent manner . . . ." Nice talking, Bill!

* * *

Superstrip!

AMONG other things in last week's super-issue, we hope you didn't miss that "Acme superstrip" on page 15. Talk about fitting a picture to a headline—there's an ad-man who should be awarded a star-spangled gonfalon for clever copy and art tie-up. Maybe a trifle on the heavy side, but then no one is perfect. We were tempted to clip the coupon and say: "Please send us one."

* * *

Inaugural

OF COURSE you will not want to miss that new department, *Power Drives*, which makes its bow in this issue, page 25. Here you will find each week a veritable mine of information on methods and equipment involved in the transmission of power in industry, all packed into the confines of one or two pages.

Many of the short items appearing here have been condensed from voluminous researches and expert treatises which would take you hours to read and digest. Our editors have boiled this ponderous material vigorously and distilled it through the copper tubes of practicality and pertinence to provide you a valuable elixir for your transmission problems.

* * *

Cheer Chart

THAT four-way hardness conversion chart we mentioned last week is already taking hold. One of our Pittsburgh friends, representing a large welding company, says it is "one of the finest things of its kind we have seen. Can we have two extra copies for our office?" They are on their way.

* * *

Lights—Camera—Action

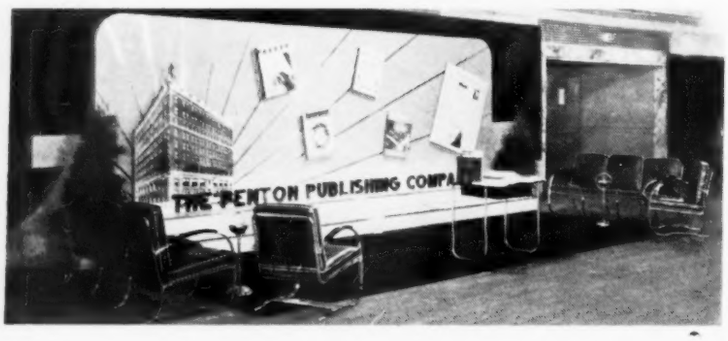
IN RESPONSE to popular demand (oh yeah?) we are printing somewhere down around the bottom of this column a picture of the Penton Publishing Co. booth at the Machine Tool Show. Our recent comments about this exhibit startled some readers into disbelief of our fancy words; we hereby submit photographic proof. Lighting effects by Richey. Gowns by Adrian. Continuity by gosh.

* * *

C'm Up 'n' Seeyus

CHICAGO readers and friends of STEEL are cordially invited to stop in this week at Booth E-34, International Amphitheatre, headquarters of STEEL at the National Metal Congress. Be seein' you.

—SHRDLU



Strip Steel

Strip Prices, Page 53

Pittsburgh—Reflecting delays in the automobile industry, strip mill operations were off a few points last week to 40 per cent for hot rolled, although in certain specialized items where lengthy processing is required, such as cold rolled and stainless, mill operations were on an uptrend. An important stainless strip contract was recently closed on by a Pittsburgh producer covering requirements which will run into several hundred tons monthly during 1936.

Cleveland—Some substantial releases for strip steel on orders previously placed by automobile interests were received by sellers here, but little new tonnage was booked from this source. Miscellaneous demand has been fair. Otis Steel Co. strip mill operated at 75 per cent.

Chicago—While new business in strip steel is slightly less active than a month ago, specifications are holding well and a rising tendency in shipments is in prospect for the near future. Deliveries to automotive in-

terests gradually are expanding, and while the volume is somewhat slow to increase in certain directions, a heavier movement is scheduled for the near future. Consumption by miscellaneous users is steady. Prices are firm but buyers are placing few contracts for entire requirements of the fourth quarter.

Boston — Miscellaneous, stamping and automotive parts requirements are supplying the bulk of cold strip volume, the upward trend in buying being at a slightly lessened rate. Hot strip demand holds steady. Prices are firm and unchanged.

New York—Manufacturers of electrical devices and novelties are stepping up production in anticipation of the holiday trade, with a resultant improvement in specifications for strip, which is now moving in perhaps the best volume in several months. Contributing to the improvement are better releases from manufacturers of automobile accessory manufacturers. Prices are steady.

Philadelphia—The trend of sales, due in a measure to increasing requirements of radio manufacturers, has been up for the past two months and sellers look for a further rise this fall. Prices are unchanged.

Youngstown, O. — Both hot and cold-rolled strip mills here are receiving considerable volume of new specifications from auto partsmakers in addition to business from numerous miscellaneous consumers. New model autobody operations are expected to speed up the operations of the larger mills shortly.

Wire

Wire Prices, Page 53

Pittsburgh — Automobile parts' manufacturers purchased a heavier volume of manufacturing wire, rods, and spring wire last week as preparations were definitely underway for quantity assemblies of 1936 models. In the merchant wire market, revised quantity extras will be in full effect Oct. 1. There has been a shade more forward buying in the merchant market, but orders for fence, nails, staples, and fence wire are all small. Bids on 2000 feet of highway guard fence were opened Sept. 27 by the federal engineers at Pittsburgh. Material is for shipment to the Tygarts river dam, West Virginia.

Cleveland — Manufacturers' wire requirements are fairly steady, and have shown a tendency to improve in some directions. Shipments to farm districts are seasonally slow.

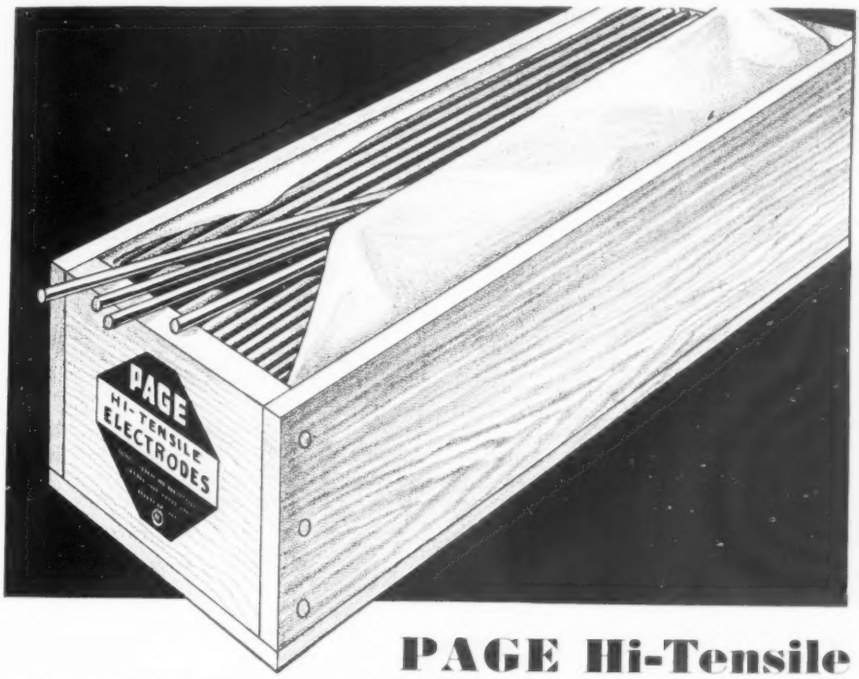
Chicago — Manufacturers' wire business for September showed a fairly substantial gain over that of August, with a further increase in automotive needs seen for October. Demand from miscellaneous users has been especially well maintained. Prices are steady though there is some dissatisfaction among jobbers over the new differentials on wire products. Wire production averages around 50 per cent.

Boston — Demand for wire, especially manufacturers' wire and specialties, holds to the recent brisk rate, although further improvement has been slight. Finishing operations are unchanged. In a few instances ingot and wire rod stocks have been built up to a point which has halted the rise in the output of raw steel. Prices are firm and unchanged.

New York—Manufacturers' wire is in easier demand although substantial orders are still coming out for agricultural wire, particularly from the Southwest.

Youngstown, O. — Manufacturers' wire requirements are being urged upon district mills in increasing volume. Other wire mill products are being made in routine fashion.

New Orleans—American Steel & Wire Co. of New Jersey, Chicago, has been awarded 1,050,000 feet of special preformed galvanized bridge wire



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strand for the United States engineer, New Orleans, at $2.083 per 100 feet, delivered. Receivers for the Williamsport Wire Rope Co., Chicago, were awarded 937,500 feet at $2.531 per 100 feet, delivered. The American company also was awarded 1,698,000 square feet galvanized welded wire fabric at $2.57 per 100 square feet, delivered.

Pig Iron

Pig Iron Prices, Page 54

Pittsburgh—Contrary to more active markets at western points, melters here are buying little more than single carloads. Two large steelworks here without blast furnaces continue to take in pig iron for their open hearths on a conversion basis, and a third, which has been using scrap predominately, has been purchasing basic iron, water delivered, from two district furnace interests. Prices are unchanged. Practically no forward buying is in evidence here.

Cleveland—Merchant pig iron sales here in the week totaled 30,000 tons, one of the largest week's business in some years. This included several lots of 5000 to 6000 tons for automobile and agricultural implement manufacturers. Melters' stocks are low, and with the possibility of higher prices, and scarcity of coke if the coal strike is prolonged, the tendency on the part of consumers is to increase inventories. An important factor also is the continued rise in scrap prices. Some foundries have been using as high as 90 per cent of scrap, making it necessary for them to buy silveries and other special grades of iron for mixtures. With the higher prices of scrap, however, this has become uneconomical. Pig iron shipments for September in this district were approximately 35 per cent higher than in August. Bookings in the month were double those of August, but were swelled by commitments for fourth quarter.

Chicago—Pig iron shipments for September are expected to be about 35 per cent heavier than in August. While buying has increased even more substantially, the upturn in deliveries is regarded to a large extent as a reflection of better foundry schedules. Forward bookings are two to three times heavier than they have been prior to the opening of any previous quarter this year. The market currently is $18.50, furnace, for No. 2 foundry and malleable.

Boston—Pig iron consumers, still covering in advance, have done so for fourth quarter delivery, an increasing number buying as needed in small lots for immediate shipment. Few are in a position to make investment purchases against a possible rise in prices, which are firm. A western Massachusetts heating equipment interest has purchased 1500 tons, southern and Dutch iron, largely the latter. Foreign iron in stock is in the largest volume in some time.

New York—Pig iron sellers here are ending another relatively satisfactory month, with sales in some quarters reported in excess of those for August. While buying has been still below normal, there has been a disposition among consumers to place larger orders.

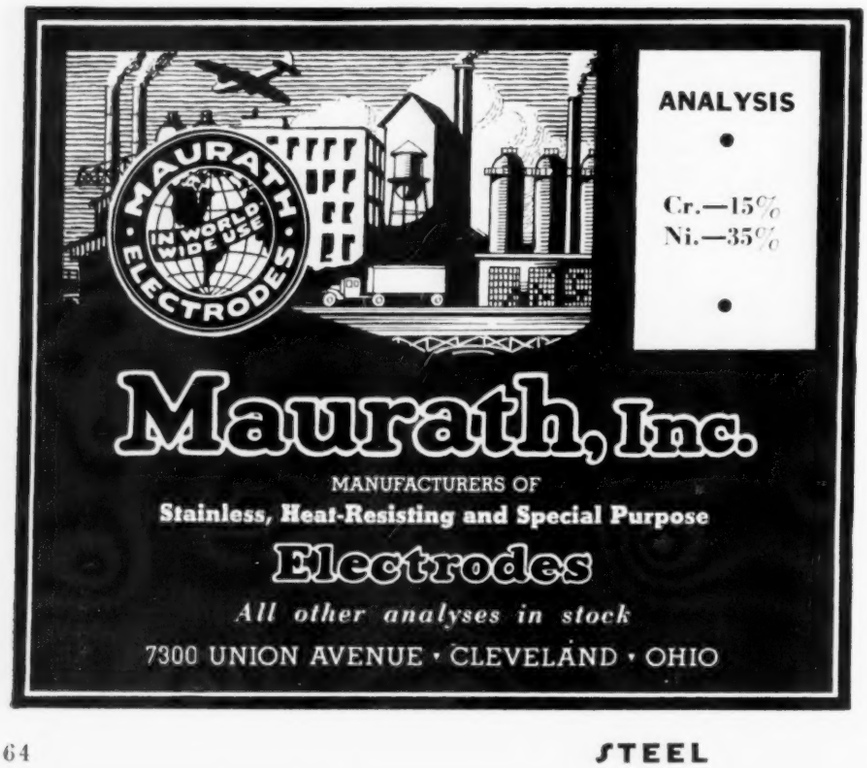
Philadelphia—Pig iron orders and shipments in this district showed a further substantial gain this month and producers expect volume in October to be at least sustained, if not heavier. Unquestionably, there has been some anticipatory buying of pig iron because of the labor disturbances in the coal fields, but producers look for further expansion in consumption this fall. Indicative of the optimism now being reflected are plans for blowing in a stack at Birdsboro, Pa., early in October and for blowing in another at Riddlesburg, Pa., later in the month.

Much interest among pig iron sellers is being focused on a hearing by the war department here Oct. 3, relative to a proposed vehicular tunnel to be installed under the Delaware river near Wilmington, Del., by the Delaware-Deep River Tunnel Co., Camden, N. J. To date the trade has been unable to obtain definite knowledge as to what type of construction will be used, should the project go ahead, and it is believed the hearing this week will throw light on this question. Should the tunnel be made of cast iron segments, possibly 10,000 tons will be required, with a lesser amount of pig iron.

Buffalo—A steelworks here has placed a third blast furnace in operation, bringing the total number of active stacks in the district up to eight, the largest number in production in this area at any one time in more than three years. While this producer anticipates an enforced withdrawal of one other furnace for repairs it will keep the latter stack in blast as long as possible. Shipments by merchants are steady and buying for future melt has reached the best proportions of the year.

Youngstown, O.—More activity is noted in the valley pig iron market with sales expanding to lots of 500 to 1500 tons each. These sales include No. 2 foundry and malleable, but with some small tonnages of basic and bessemer. Prospects for continued activity appear better now than at any time in the past four years. The Cherry Valley blast furnace at Leetonia, O. of Davison Coke & Iron Co., Pittsburgh, appraised at $22,000, will be offered for sale by Frank Ballentine, Columbiana county sheriff, at the court house in Lisbon, O., Oct. 22. The stack operated until six years ago.

Cincinnati—Contracting for pig iron supplies for fourth quarter continues steady, and so far has been close to the third quarter level. Inquiries are appearing more frequently, as if in anxiety over price advances, although bookings for in-



ventory appear light so far. Shipments indicate little change, if any, in the melt.

St. Louis—Shipments of pig iron continue at a high rate and new orders are heavy. Certain sellers report September will represent the largest volume of sales and shipments experienced since 1929. Melters generally have reversed the policy of purchasing for immediate needs, and are anticipating future requirements on a large scale. This is due to need for iron, also to the belief that a price advance is in prospect during the next few weeks.

Birmingham, Ala.—Two blast furnaces are in readiness and will be blown in shortly, increasing daily production by 900 tons at least. Base price, $14.50, No. 2 foundry, is firm. No fear is expressed that cessation of work at coal mines will disturb the pig iron market.

Seattle—Fourth quarter prices, just announced, are unchanged, No. 1 Columbia being quoted at $17.50, base, and $24, delivery here. The volume of sales is somewhat larger, indicating a better tone in the foundry industry. Specialty shops have been running steadily.

Toronto, Ont.—Despite the fact melters are anticipating increased operations before the end of the year, there has been no advance buying of pig iron in the Canadian markets. Sales are running to better volume, but demand is spot delivery only.

Scrap

Scrap Prices, Page 55

Pittsburgh—Last week a district steelworks here negotiated an important scrap trade by buying 15,000 tons of No. 1 heavy melting steel for Pittsburgh district shipment at $14 a net ton, delivered, and arranged for payment by giving the seller a similar amount located at Cleveland resulting from steelworks dismantling there. The Cleveland material was sold on the basis of $12.50 a ton at that point. The Pittsburgh point which bought will soon divulge an innovation in accepting heavy breakable cast scrap which is also a result of the Cleveland wrecking operation, but which has no trade or conversion feature.

The present market, is strong, but dull from the standpoint of new buying. Considerably heavier railroad lists are out for bids: The Pennsylvania on Oct. 2 with 24,000 tons, including 10,650 tons of No. 1 heavy melting steel, and the Baltimore & Ohio, Oct. 9, with three 1500-ton items leading. An unstated tonnage of nickel steel scrap, which will be eventually exported, was sold jointly by Carnegie Steel Co. recently to United Iron & Metal Co. and Max Meltzer Co., both of Pittsburgh.

Cleveland—The scrap trade here continues dull with consumers fairly well supplied for the time being. A shipload of old material from the wrecking of the Newburgh works here of the American Steel & Wire Co. has just been started up the lakes to Duluth where it will be used in the company's open hearths there.

Chicago—Scrap continues quiet in the consumers' market, though shipments against old contracts are heavy. Mills refrain from making new commitments, but are expected in the market shortly. Scrap is coming out rather freely but this has had little effect on prices, which generally are steady. Heavy melting steel nominally is unchanged at $12.25 to $12.75. A boatload of 2500 tons of borings left East Chicago last week for delivery to an eastern port.

Boston—Scrap shipments to Italy are lighter, but buying for boat loading features activity. While $9.75, dock, has been paid for No. 1 heavy melting stel to fill an old contract, the market is not generally established at that price and on new business dealers are offering considerably less. Prices are firm for domestic shipment with shipments light to both New England and outside consumers. The higher price paid for heavy melting steel mentioned above is for material destined for Italy, the dealer being anxious to fill the order. Heavy cast and shafting are firmer by 25 cents a ton.

New York—Scrap prices are steady with a strong undertone. Buying for export is largely against old contracts and shipments to Italy are somewhat slackened by higher insurance rates. For eastern Pennsylvania, buying in northern New Jersey continues with prices slightly above those at docks, New York. Other grades are firm with shipments in small lots.

Philadelphia — Possibility that scrap will not be placed on the embargo list of shipments from this country to warring nations abroad in the event of actual hostilities is serving to bolster an otherwise slightly easier scrap market here. Such raw materials as scrap, cotton and certain other commodities are known to be under careful consideration by Washington for embargo in the event of an actual outbreak, but the best trade opinion here at the moment is that if such action eventually is taken it will not be for some time and that if limitations do develop they will more likely be brought about through curbs on credit. Meanwhile, war risk clauses in insurance contracts have been canceled in many

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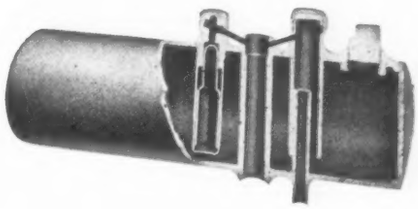

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instances and this in turn has led to negotiations resulting in substantially higher rates.

Buffalo—Increased melt in all units of steelworks this week led dealers to forecast almost immediate sales of scrap in heavy tonnage. Dealers have centered attention on a $13 price for No. 1 heavy melting steel and are said to be buying actively within a range of $12 to $12.50, although consumer purchases are lacking. Marked strength in the entire list is claimed and is being continued because of small receipts and higher outside offers which continue to divert much scrap from Buffalo.

Youngstown, O.—So well supplied with scrap are the important consumers in this district that new buying is slow and the market here dull but prices continue firmly held. One leading steelmaker here has been forced to continue restrictions on scrap shipments.

Detroit—Undertone of the iron and steel scrap market is notably strong, evidenced by price increases this week in No. 1 busheling, new heavy auto cast, rails, bundles and auto malleable. Scrap offerings by automobile manufacturers are increasing as new models get under way.

St. Louis—Scrap iron and steel prices continue steady with strength particularly notable in foundry grades, including malleable. Heavy operations at stove, implement and heating apparatus plants have cut available supplies of cast scrap, and dealers with contracts are experiencing trouble in obtaining material to ship. The upturn in prices during the past few weeks has stimulated the movement of country scrap. Heavy replacement purchasing of farm machinery has resulted in extensive demolition of old equipment. Railroad offerings are small.

Cincinnati—Quotations on iron and steel scrap moved higher on underlying strength, despite resistance of mills to tonnage purchases at current quotations. Dealers are holding supplies tightly in anticipation of mill buying as soon as the outlook is clarified. Foundry grades are especially active.

Birmingham, Ala.—A better tone is noted in the market and further sales of heavy melting steel are reported. Prices are firm, heavy melting steel holding at $8.50 to $9.50.

Seattle—The export market is at a standstill but shippers expect a decided improvement soon. War in Ethiopia would stimulate Japanese demand for steel scrap. Japan has stocks that ordinarily would last until January. In the meantime, there is practically no export inquiry. Dealers at tidewater have only small stocks. No. 1 scrap for export is $9.50 to $10, f.a.s., and rails $11 to $11.25 f.a.s.

Toronto, Ont.—Minor improvement is reported in demand for iron and steel scrap and local dealers recently moved up their buying prices. Mills are taking better quantities of heavy melting steel, for which dealers now are offering $8 per gross ton. There has been some call for wrought iron and steel axles with offerings of $8.50 and $8 a gross ton, respectively. Boiler plate is up 50c to $5 gross, while malleable and stove plate have been marked up to $7 and $5 per net ton.

Warehouse

Warehouse Prices, Page 56

Pittsburgh—Jobbers are preparing to adopt revised quantity extras on cold-rolled steel, following the initiative being taken by Chicago jobbers the middle of last week. It is expected that Pittsburgh jobbers will issue their revised list for effect with Oct. 1. Meanwhile, all base prices remain unchanged.

Cleveland—Warehouse sales in September were practically equal to those of August for leading interests here. Mill extras will be put in effect in warehouse prices Oct. 1.

Chicago—Sales lately have been more numerous, showing a moderate gain over August and an even larger increase compared with a year ago. Recent betterment has been somewhat contra-seasonal though jobbers look for a continuation of improvement through October. Prices are unchanged.

Boston—Demand for alloy and specialty steels holds to the recent improvement, with regular lines steady. Buying in small lots is sustained and prices are fairly steady. Pipe resale volume is heavier, with prices somewhat mixed.

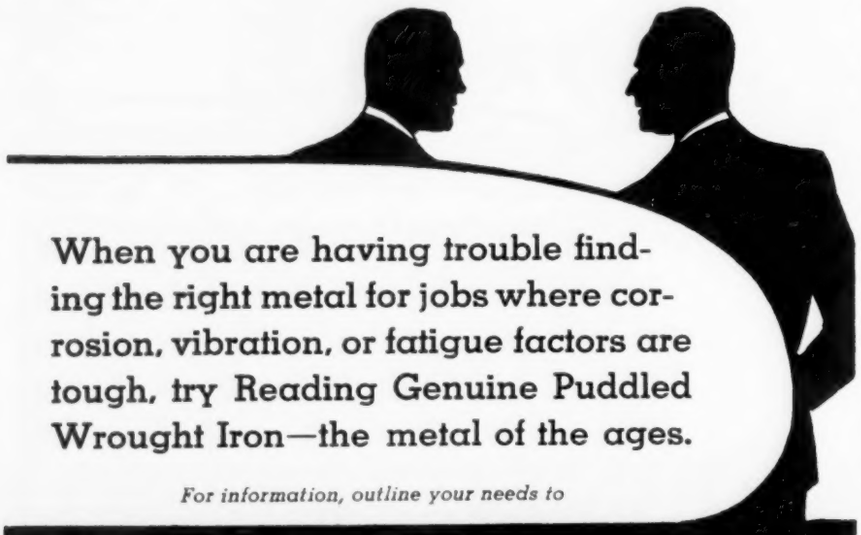
Philadelphia—Effective Oct. 1, leading jobbers will advance commercial steel bars $2 a ton, from 2.93 to 3.03. A new schedule of extras on cold-finished steel will also be inaugurated, to conform with revisions in mill extras. Business in the month now closing appears to be about on a parity with August. Jobbers anticipate improvement in October.

Detroit—Warehouse business in iron and steel continues on a highly sustained level. Some price changes reflecting recent mill adjustments are in prospect.

Cincinnati—Warehouses here announce that price adjustments in cold-rolled bars, in accord with new mill extras, will be effective Oct. 1. Buying is well distributed, tonnage for this month to be somewhat better than August.

St. Louis—Sales thus far in September are moderately larger than in August, and are in excess of the total a year ago. Lumber and cotton seed milling interests are taking liberal tonnages, and the glass, quarrying and cement manufacturers are also heavy buyers. Furniture manufacturers since mid-summer have shown greater activity than during any like period since pre-depression times. Tool and shovel stock is reported active.

Seattle—Seasonal fall buying is in



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evidence and the turnover out of stock is substantial. Volume has been increased by demand from the lumber industry, while Alaska buyers continue actively in the market. Repair work is more general than new construction. Light plates, angles and bars continue to lead the list, but other items are also moving satisfactorily. Prices are being maintained.

Iron Ore

Iron Ore Prices, Page 55

Cleveland — Lake Superior iron ore shipments in September were approximately 4,900,000 tons, the last few days of the month being estimated. This was the largest of any month so far this year, and compares with 4,780,000 tons in August.

On this basis, shipments for the year to Oct. 1 total 22,286,000 tons, 16 per cent more than in the comparable period in 1934. With the tendency to increase shipments, in response to stronger demand for pig iron, and at least two more months for vessel transportation, it begins to appear the movement for the season will be 30,000,000 tons or more, compared with 22,064,000 tons in 1934, and largest since 1930 when 47,188,000 tons were shipped.

Tin Plate

Tin Plate Prices, Page 52

Pittsburgh — Canmakers' releases are disappointingly slow, and it now appears a large amount of finished tin plate will be carried over into the 1936 season. Mill operations are holding at about 50 per cent, although some producers last week were at 75 per cent. Owing to uncertainties over the 1936 market on pig lead, it is doubtful if the 1936 contract price on tin plate will be announced until the latest possible date. Meanwhile, the market holds at $5.25 per base box, Pittsburgh.

New York—Tin plate specifications reflect a decline in canning requirements but are being bolstered somewhat by continued good demand for miscellaneous needs.

Youngstown, O.—Tin plate operations still are fairly well sustained by orders from miscellaneous sources. This week the Republic Steel Corp. is doubling the number of its active tin plate mills at Warren, 24 units to be put in operation against 11 last week. Purpose of this speeding up is to provide sufficient stocks for the period when these mills will be shut down later in the autumn while the plant is being modernized at a cost of around $1,000,000, the work to be completed by the first of the year.

Steel in Europe

Foreign Steel Prices, Page 56

London — (*By Cable*) — Productive capacity for semifinished steel is unequal to current demands from rolling mills in the Midland district. Steelworks generally are active on structural and automobile material, with good prospects for several months. Pig iron stocks in the Middlesbrough district are low and more blast furnaces are to be relighted. Export inquiry is more extensive.

The Continent reports slackness in most departments is due to the European crisis. Public building projects are the mainstay of the domestic steel industry. Recovery continues in Germany.

Nonferrous Metals

Nonferrous Metal Prices, Page 54

New York—Demand for nonferrous metals exceeded all expectations last week. Sales were lighter but the volume was satisfactory in view of the heavy tonnages sold during the preceding period. All metal prices were firm to higher.

Copper—Primary producers continued to quote 9.00c, Connecticut, for electrolytic. Some interests look for 10-cent copper by the first of the year, however. Demand during the week was surprisingly spirited with fabricators taking substantial tonnages each day. The export market was strong and sales were made above the 8.75-cent level. Threat of war abroad continued an important factor in the market. It was understood that Italy closed recently on 75,000 tons of copper and will purchase 45,000 additional tons next month.

Lead—A strong situation developed in lead but prices held at 4.35c, East St. Louis, and 4.50c, New York. St. Joseph Lead Co. continued to ask $1 premium in the latter market on certain of its grades. A substantial tonnage was awaiting placement when books were officially opened at the end of last week.

Zinc—Producers are in a well sold position and continued to quote 4.75c, East St. Louis, for prime western despite light sales.

Tin—Prices fluctuated widely reflecting sterling exchange rates and the London market. While Straits tin dropped sharply during the early part of the week, a recovery was made during the latter part. It was pointed out that should the Suez canal be closed as a result of hostilities abroad a serious shortage of tin supplies

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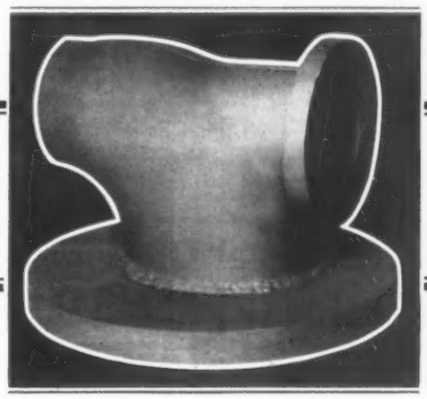

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would likely develop. At the close of the week Straits spot was quoted fractionally below the 50-cent level and at the high for the week.

Antimony—Chinese spot advanced 1½ cents to 14.50c, duty paid New York. The rise was attributed to scarcity of supplies and the threat of war. Business was dull throughout

Ferroalloys

Ferroalloy Prices, Page 54

New York—Ferromanganese sellers look for improved shipments this month, in view of the probability of a further gain in steelmaking operations. Most leading consumers are now under contract at $85, duty paid, Atlantic and Gulf ports, although they are watching with interest developments in the Italo-Ethiopian situation and those relative to the pending reciprocal treaty between this country and Brazil, both of which bear primarily on manganese ore and indirectly on ferromanganese.

Indications appear favorable for the early ratification of the reciprocal treaty by the Brazilian legislature. The operation of this treaty would result in the reduction of tariff on manganese ore from all leading producing countries, particularly Russia. This should later serve as a depressing factor on ferromanganese prices; on the other hand, actual hostilities in the Mediterranean area would be of a distinctly bullish character in their bearing on prices. Transportation insurance has already increased because of the threat of possible outbreak on the other side.

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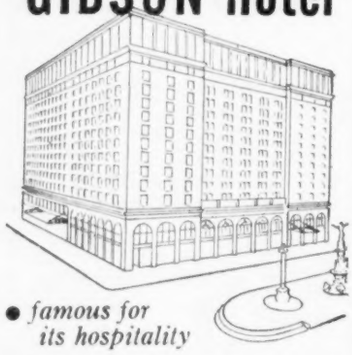

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Metallurgical Coke

Coke Prices, Page 53

Virtually a complete tie-up in the western Pennsylvania soft coal mines last week, had little repercussion in the coke market. This was due to the fact that coal above ground for both by-product and beehive coking was adequate for many weeks' needs. However, the shutdown was a factor for a stronger undertone in coke prices.

Chicago reports September foundry coke shipments are about 50 per cent heavier than in August. This increase has been prompted to a large extent by higher prices which are expected to go into effect Oct. 1. The market recently has been $8.50, ovens, for outside delivery and $9.25, delivered Chicago, with an increase of 50 cents seen as not unlikely on October contracts.

At Birmingham coke production is undisturbed. Surplus stock is considerable, and demand is steady. Prices here are steady.

A sharp increase in by-product foundry coke shipments is noted at Cincinnati. Prices are unchanged so far, despite conditions in coal fields.

Personals

(*Concluded from Page* 18)

American Welding society, and since 1919 has served as chairman of its committee on filler metal specifications. In 1922 he was elected president of the society, and during his tenure he was active in organizing its local sections. From 1923 until the present time he has been treasurer of the society.

Mr. McCune has been president of the International Acetylene association, and is a member of the American Society of Mechanical Engineers, the American Society for Testing Materials, and the advisory board of the national bureau of standards.

• • •

William Godbey has been appointed representative in Kansas, Nebraska, western Missouri, and southwestern Iowa for Kennedy Valve Mfg. Co., Elmira, N. Y. His headquarters will be in Kansas City, Mo.

• • •

Paul B. Gilroy has been appointed manager of sales in the Cleveland district for the American Steel & Wire Co. Mr. Gilroy has been serving as assistant manager under A. T. Merriman, who has been ill for several months, but who will continue his connection with the office. Mr. Merriman has been associated with the American company for 33 years. Mr. Gilroy has been with the company 25 years, 13 years in the Cleveland district.

• • •

F. A. Beatty, chief engineer of the Lewis Foundry & Machine Co., Pittsburgh, subsidiary of Blaw-Knox Co., has been appointed vice president of the company. He came to Lewis Foundry & Machine in 1923 as assistant to the chief engineer, and in 1927 was named chief engineer.

• • •

Clyde Bayer, formerly open-hearth superintendent of Great Lakes Steel Corp., Detroit, a division of National Steel Corp., Pittsburgh, is now works manager of Weirton Steel Co., Weirton, W. Va., another National Steel subsidiary. He succeeds H. E. McDonnell.

J. Munns, formerly identified with Continental Can Co., has been named assistant to the vice president of Weirton Steel Co., Weirton, W. Va.

• • •

Ralph R. Teetor, vice president in charge of engineering, Perfect Circle Co., Hagerstown, Ind., has been nominated for president of the Society of Automotive Engineers for 1936.

David Beecroft, manager, New York office, Bendix Aviation Corp., is the nominee for treasurer. Nominees for new councilors include Joseph A. Anglada, president, Anglada Motor Corp., Detroit; Louis Schwitzer, president, Schwitzer-Cummins Co., Indianapolis, Ind.; and Alex. Taub, development engineer, Chevrolet Motor Co., Detroit.

Activities of Steel Users and Makers

STEEL INDUSTRIES ENGINEERING CORP., Pittsburgh, has received an order for one American electric clay gun through Ashmore, Benson & Pease Ltd., England, for installation at the Richard Thomson & Co. works, Wales.

♦ ♦ ♦

E. J. Lavino & Co. and subsidiaries have moved their offices to 1528 Walnut street, Philadelphia.

♦ ♦ ♦

A. O. Smith Corp., Milwaukee, has added about 400 employes to its automobile frame shop in the last 30 days to handle increasing delivery specifications, as passenger car factories swing over to new model production.

♦ ♦ ♦

Timken Roller Bearing Co., Canton, O., has received an order from the Pennsylvania railroad for roller bearings to equip all axles of the tenders of eight of its steam locomotives. The application will be made at the Pennsylvania's Altoona, Pa., shops.

♦ ♦ ♦

National Carbon Co, Inc., 30 East Forty-second street, New York, has been appointed sales agent for the Soderberg (self-baking) electrode in the United States and Canada.

♦ ♦ ♦

American Hammered Piston Ring Co., Baltimore, and the Skinner Chuck Co., New Britain, Conn., are to co-operate in the manufacture and sale of "gold seal" and "silver seal" piston rings, which have been adopted as standard equipment in some diesel engines and in some high capacity refrigerating machinery, and possibly later may be offered for automotive use.

♦ ♦ ♦

Allied school of mechanical trades, which is the school division of Allied Screw Machine Co. Inc., 609 West Lake street, Chicago, has created a scholarship to be awarded to the most promising man from the ranks of enrolled CCC men. The selection will be made by CCC educational officers, probably from the Sixth division, or of a Chicago enrollee in any camp. The selected candidates will be given the option of a course of training in the machinist trade or in automatic screw machines in the machine shops of the Allied School.

♦ ♦ ♦

Crucible Steel Co. of America, New York, has opened a new branch warehouse at 308-12 West Maryland street, Indianapolis, to handle the distribution of steel in the Middle West. Large stocks of tool and specialty steels will be carried. This expansion is in line with the company's policy to modernize and keep its plants and equipment in the best possible condition. The number of employes will be increased. The local branch will serve practically all of Indiana, with the exception of a small fringe around Chicago, and the western half of Kentucky.

Meetings

METAL TREATING institute will hold its annual meeting at the Palmer House, Chicago, Oct. 2. The general meeting will be preceded by a meeting of the board of trustees at noon on Oct. 1. Holding the meeting during the National Metal congress and exposition is expected to increase attendance.

The organization comprises about 40 commercial heat treating shops in the United States. Officers are: President, R. J. Hoensheid, Commercial Steel Treating Corp., Detroit; vice president, A. N. Lindberg, Lindberg Steel Treating Co., Chicago; secretary, A. H. Nuesse, Wesley Steel Treating Co., Milwaukee; and treasurer, W. S. Bidle, W. S. Bidle Co., Cleveland.

GEAR MAKERS TO NIAGARA

Semiannual meeting of the American Gear Manufacturers association will be held at the General Brock hotel, Niagara Falls, Ont., Oct. 14-15. Eight papers have been scheduled. J. C. McQuiston, Wilkinsburg, Pa., is secretary.

TO TALK STANDARDIZATION

Annual meeting of the Refrigerating Machinery association, at Chicago, Oct. 11, at the Palmer house, will see the beginning of a broad equipment standardization program recommended by its executive and standards committee.

INFORM-A-SHOW IN CLEVELAND

Purchasing Agents Association of Cleveland Inc. has scheduled its eighth annual inform-a-show for the Hotel Cleveland, Nov. 20-22. The exhibit is under management of R. R. Ricker, editor of *The Midwest Purchasing Agent*, Penton building, Cleveland. All space has been sold. The working model of the New Youngstown Sheet & Tube Co. continuous wide sheet-strip mill will be exhibited.

SCRAP INSTITUTE TO CLEVELAND

Institute of Scrap Iron and Steel Inc. will hold its semiannual meeting at Hotel Statler, Cleveland, Oct. 23 and 24. A new board of directors will be elected; by-laws will be amended; a program for 1936 will be prepared.

Steel Corp. Shifts Offices In Philadelphia

United States Steel Corp. subsidiary companies at Philadelphia will move Oct. 1 to the Broad street station building, 1617 Pennsylvania boulevard, that city. Except for the Universal Atlas Cement Co., which has offices at 161 Walnut street, all are now located in the Widener building, Chestnut street. The subsidiary companies will occupy the entire

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The companies affected by the change are the Carnegie-Illinois Steel Corp., American Sheet & Tin Plate Co., American Bridge Co., Tennessee Coal, Iron & Railroad Co., United States Steel Products Co., American Steel & Wire Co., and the National Tube Co., as well as the Universal Atlas Cement Co.

Equipment

Chicago—Machine tool inquiries are more active here, a major portion of the increase being attributed to the recent Cleveland exposition. While orders lately have shown little change, the gain in volume of pending work and proposed purchases points to an early upturn in sales. Small tool demand continues active, having been unusually well maintained during the past 60 days and reflecting sustained operations at most metalworking plants. Among the largest prospective machine tool orders are those from International Harvester Co. which will purchase a number of tools for its East Moline, Ill., Ft. Wayne, Ind., and Springfield, O., plants where facilities are being enlarged. Other buying for plants at Milwaukee and Chicago also is planned.

Railroad inquiries continue light, being confined to a small list which still is pending for the Milwaukee road. Foundry equipment business is well maintained, continuing more active than a year ago. Miscellaneous plant improvement work is furnishing a steady volume of business in various types of equipment.

Pittsburgh—A heavy volume of inquiry continues to dominate the steel mill equipment market, although sellers do not report any important contracts having been closed in the past week to ten days. Leading American steel mill equipment builders, many of whom are booked to capacity already, are being virtually flooded with foreign inquiries, including notably those from England and Japan. A heavy world-wide volume of inquiry is noted for the reversing-type hot mill which Mackintosh-Hemphill Co. and Cold Metal Process Co. recently constructed for McLouth Steel Corp., Detroit. Despite previous reports to the contrary, all of the engineering details on the new Carnegie Steel Corp. plate mill for Homestead, Pa., have not yet been ironed out and award of the mill will be delayed for at least another month.

Boston—Machinery building shops in New England are active and in some instances pushed for delivery. Volume continues to be taken as an aftermath of the recent Cleveland show. Orders for recently developed automatic special equipment lead. One of the largest offerings of used equipment, including cranes and steel fabricating equipment, is being made by the liquidation of the Palmer Steel Co. shop, Williamsett, Mass.

Seattle—Business continues active with the number industry making replacements and demand from Alaska still at peak-season levels. Mining machinery and equipment are being bought in impressive volume.

Construction and Enterprise

Illinois

CHICAGO—E. A. Baumbach Mfg. Co. 1812 South Kilbourne avenue, manufacturer of die sets, has started work on a $90,000 addition to its plant. Robert G. Regan Co. is general contractor.

CHICAGO—Continental Can Co., 100 East Forty-second street, New York, plans a $100,000 addition to its West Grand avenue plant. The new unit, 260 x 120 feet, will be used by the research department.

CHICAGO—Diamond T Motor Car Co. is building a 100 x 600 foot addition to its plant at 4517 West Twenty-sixth street. The building is to be used for assembly and storage purposes and will cost $125,000.

CHICAGO—Five Way Expansion Joint Co. 20 North Wacker drive, has been incorporated by Henry A. Taubensee, Nissen N. Gross, and Selma Klein, to deal in metal products. Correspondent: Nissen N. Gross, 326 West Madison street.

EDWARDSVILLE, ILL.—City, W. C. Straube mayor, plans constructing municipal light and power plant, equipped with two diesel engines or steam generating units. Cost estimated between $384,000 and $393,000. C. E. Smith & Co., Railway Exchange building, St. Louis, engineer.

MORRISON, ILL.—City Ice & Fuel Co., 6611 Euclid avenue, Cleveland, is planning to double the capacity of its subsidiary here, the Ice Cooling Appliance Corp., manufacturer of refrigerating equipment, and to expand the research and testing laboratory. The enlarged plant will have an output of 15,000 units monthly.

PEORIA, ILL.—Wheeling Corrugated Steel Culvert Co. has begun work on foundations of the new foundry shops it is erecting at South Washington and Dodge streets.

Ohio

CLEVELAND—Brass Products Mfg. Co. has leased a factory building at 10101 Quincy avenue for manufacturing purposes.

CLEVELAND — Progress Vacuum Cleaner Corp., a new concern, has leased space in the former plant o fthe American Multigraph Co. at East Fortieth street and Kelley avenue, for the manufacture of vacuum cleaners and other electrical appliances.

CONNEAUT, O.—City plans erecting electric light plant and distribution system, costing $248,000, and gas manufacturing system, costing $440,000. Application will be made to PWA for outright grant of $309,000 and loan of $378,000 to finance projects.

DAYTON, O.—Bendix Aviation Corp., Vincent Bendix president, has acquired the Radio Products Co. plant here which will be enlarged and remodeled and new equipment purchased, at an estimated cost of $250,000, for the production of blind flying and landing instruments.

PORTSMOUTH, O.—Foster Stove Co., Ironton, O., is reopening the foundry department of the Portsmouth Stove & Range Co. here. The plant has been idle for five years.

Indiana

BLUFFTON, IND.—General Machinery Co. Inc., has been formed to manufacture bread slicing and wrapping machines, by Carl Littlefield, Victor E. Brown and George S. Morris. The company has leased quarters and will start manufacture of equipment shortly.

FORT WAYNE, IND.—Branstrator Body Co. Inc. has been formed to manufacture automobile bodies, by Clem G. Branstrator, Dallas D. Branstrator, Wayne P. Branstrator and Joseph V. Huguenard.

HARTFORD CITY, IND.—Stutz Fire Apparatus Co. has begun construction of an addition to its plant. A. C. Mecklenburg is president.

INDIANAPOLIS — Schwitzer - Cummins Co., manufacturer of stoker equipment, has been given approval to erect an addition to its plant. The addition, comprising 20,000 square feet of floor space, follows close on another expansion project just completed. Louis Schwitzer is president.

Michigan

DETROIT—Triplex Engineering Corp. has been incorporated with $10,000 capital stock by D. E. Hokin, 542 West Jefferson avenue, to manufacture automotive parts.

DETROIT—Continental Die Casting Co., 2950 East Woodbridge street, is erecting a factory building on Grinnell avenue. Frederick J. Winter is architect.

PONTIAC, MICH.—Pontiac Motor Co. is preparing to reopen its foundry after a four-year shutdown, at a cost of $500,000 for new machinery and renovation.

New York

BALDWINSVILLE, N. Y.—National Cellulose Co., manufacturer of paper specialties, has leased a building on Thompson road, Syracuse, N. Y., and will modernize and equip same for its own use. Estimated cost $28,000.

BAYVILLE, N. Y.—City has appplied for PWA funds of $45,000 for constructing well and installing pumping equipment and elevated tank. S. B. Bowne, Mineola, N. Y., civil engineer.

BUFFALO—Trico Products Corp., 817 Washington street, has plans nearing completion by W. R. Jewel, engineer, and will soon take bids for 2-story, 50 x 100 foot, steel factory and warehouse. Cost $45,000.

NEW YORK—Grafion & Duflat Inc.

(Please turn to page 72)

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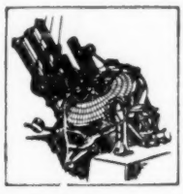
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(*Concluded from page 70*)

has been incorporated to manufacture tools and machinery, by Murray R. Paris, Martha Spector and Herman Selar. Papers were filed by Murray R. Paris, 521 Fifth avenue.

NIAGARA FALLS, N. Y.—E. I. du-Pont de Nemours & Co. Inc., Buffalo avenue, E. Fish in charge, is receiving bids for the construction of a factory addition.

Pennsylvania

WILLIAMSPORT, PA.—J. K. Mosser Leather Co., Henry W. Boyd president, is planning to make extensive changes in its plant, including replacement of boilers.

Alabama

DOTHAN, ALA.—S. B. Bennett & Sons are installing machinery in a woodworking plant to be known as Dothan Novelty Works.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids Oct. 8, schedule 6033, one motor-driven turret lathe, delivered Mare Island, Calif.; schedule 6035, one motor-driven turret lathe and equipment, delivered Norfolk, Va.; schedule 6037, electric portable pumps, delivered Sewall's Point, Va.; schedule 6041, one motor-driven heavy duty manufacturing type engine lathe, delivered Norfolk, Va.

Georgia

MILLEDGEVILLE, GA.—Board of control eleemosynary institutions, 216 State Capitol building, Atlanta, Ga., is having plans prepared for a $350,000 central heat, power and light plant for state penitentiary. Equipment will include boilers, electric equipment, generators, power line, steam pipes, etc.

Florida

FORT MYERS, FLA.—City, Dave Shapard, mayor, plans erection of soft water plant, costing $200,000. Application is being considered by PWA.

TAMPA, FLA.—City, Mayor Chancey, will apply for loan and grant of $1,450,000 for constructing first unit of sewer system.

North Carolina

CARTHAGE, N. C.—State PWA officials approved $58,181 for constructing water and sewer systems.

HEMP, N. C.—State PWA officials approved $192,500 for water and sewer systems.

Tennessee

MEMPHIS, TENN.—Angel Food Ice Cream Co., 2859 Poplar street, plans remodeling and enlarging its building, including installation of new equipment. Raymond B. Spencer is architect.

SPARTA, TENN.—Sparta Spoke Factory plans erecting a woodworking plant and installing equipment. Estimated cost $28,000.

Virginia

RICHMOND, VA.—A $2,000,000 addition to the Twelfth street power plant of the Virginia Electric & Power Co. is contemplated, according to Jack G. Holtzclaw president. Funds will be derived from the proceeds of a $40,000,000 bond issue the company plans for the near future.

Missouri

CARUTHERSVILLE, MO.—City plans to erect power plant, costing approximately $201,000. Application has been made to PWA.

KIRKSVILLE, MO.—City has made application to PWA for grant of $287,000 to help finance construction of and equipment for a municipal light and power plant, costing approximately $639,000.

MACON, MO.—City plans to purchase electric generating equipment for municipal power plant, costing $80,000. Baumes & McDevitt Co., 1871 Railway Exchange building, St. Louis, engineer.

ST. LOUIS—Hyde Park Brewery is planning to expend $250,000 for equipping its plants and erecting a garage.

Oklahoma

NOWATA, OKLA.—City plans constructing municipal light plant at a cost of $200,000. Application has been made for PWA loan. V. V. Long & Co., Colcord building, Oklahoma City, Okla., engineer.

PAULS VALLEY, OKLA.—City plans electric light and power plant, costing about $250,000. V. V. Long & Co., Colcord, building, Oklahoma City, Okla., engineer.

Texas

BROWNSVILLE, TEX. — Magnolia Oil Co. plans the construction of a receiving and storage plant for petroleum products, with facilities for handling distribution. Estimated cost $75,000.

ELECTRA, TEX.—City will vote Oct. 1 on $75,000 bonds for erection of power plant.

DALLAS, TEX.—D. & B. Pump & Supply Co., division of Emsco Derrick & Equipment Co., 301 West avenue, Los Angeles, has under construction an extension to its sucker rod manufacturing plant, and modern equipment will be installed. Plans are also being prepared for constructing a machine shop building, 124 x 210 feet. Equipment will consist of automatic screw machines, hand screw machines and heat treating equipment.

Wisconsin

MILWAUKEE—Koller Die & Tool Co., 2019 South Kinnickinnic avenue, is arranging to increase its floor space to 12,000 square feet. It has purchased a 2-story brick plant at 1116 South First street and is now remodeling it for early occupancy.

MILWAUKEE—Badger Nail Co., a steel wire nail manufacturing concern, recently inactive, is selling out its entire plant at 253 South Muskegon avenue, including machinery, geared tumbling and polishing barrels, platform scales, small tools, blowers, fans and heating coils.

WAUSAU, WIS.—Bids will be taken shortly by Marathon county clerk for construction of highway department machine shop, garage and warehouse, 70 x 300 feet, with wing, 30 x 69 feet, for boiler room. Architects are Oppenhamer & Obel, Wausau, Wis.

Minnesota

MARSHALL, MINN.—City plans improvements to municipal power plant, costing about $74,000. PWA funds have been applied for. G. M. Orr & Co., 408 Baker building, Minneapolis, engineer.

Kansas

EUDORA, KANS.—City plans new complete waterworks plant, costing approximately $50,000. Has filed application with PWA for loan and grant. Shockley Engineering Co., 80 Graphic Arts building, Kansas City, Mo., engineer.

LENEXA, KANS.—City plans constructing waterworks system, including installation of two tanks and two towers. Cost estimated at $65,000. Schockley Engineering Co., 80 Graphic Arts building, Kansas City, Mo., engineer.

MOUND VALLEY, KANS.—City has filed application with PWA for loan and grant of $50,000 to finance new waterworks plant. A. C. Moore, Joplin, Mo., engineer.

Nebraska

LINCOLN, NEBR.—Fire recently destroyed the Northwestern Iron & Metal Co. warehouse at Eleventh and X streets.

Montana

KALISPELL, MONT. — Mountain States Power Co. is spending $45,000 in replacements at the Big Fork plant. Work includes installation of two new 1000-kilowatt generators, electric control head gates, and a 2000-foot concrete flume. H. F. Lill is manager.

Arizona

PHOENIX, ARIZ.—Pan American Whiskey Distillers, L. J. Morris in charge, East Van Buren street, has acquired the plant formerly occupied by Continental Packing Co. and will alter same for distillery. Estimated cost $100,000.

Pacific Coast

PORTLAND, OREG.—Mitchell, Lewis & Staver, manufacturers of machinery and equipment, have awarded contract to Wegman & Son, for a 4-story, 100 x 120 foot warehouse at 230 Northwest Broadway.

PORTLAND, OREG. — Benz-Knapp Inc. has been incorporated to manufacture tools, hoists and metal products, by August Benz Jr., Paul Knapp, and Jack Knapp. Papers were filed by A. Allehoff attorney, Portland.

SEATTLE—Keystone Steel & Wire Co. has awarded contract for construction of a 1-story warehouse, 50 x 120 feet, at 1225 Railroad avenue, South.

Dominion of Canada

SAULT STE. MARIE, ONT.—Algoma Steel Corp. plans construction of a universal plate mill, a tin plate mill and a sheet mill.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd. has started on a $500,000 expansion program for its foundry here, which will double the size and permit casting of brake drums and other parts of alloy steel or alloy iron in addition to the cast alloy steel crankshafts now being made.